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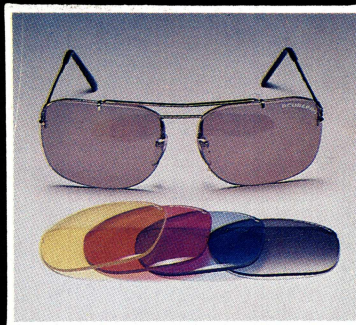
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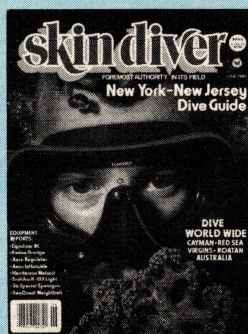
skin diver

Volume Thirty-three Number Six

FEATURES

- | | | | |
|-----------------|-----|---|-----------------------------------|
| DIVE EQUIPMENT | 22 | THE WHALE BAG | GERI MURPHY |
| | 38 | SEAQUEST'S POSITIVE RELEASE WEIGHTBELT | JIM WALKER |
| | 47 | TOSHIBA K-133 U/W LIGHT | BONNIE J. CARDONE |
| | 49 | HENDERSON'S RED CORAL WETSUIT | BONNIE J. CARDONE |
| | 50 | DACOR AERO 350A REGULATOR | GEORGE COZENS |
| | 54 | PARKWAY'S OCEAN JACKET | MARTY SNYDERMAN |
| | 55 | ABBILLER 36 SPECIAL SPEARGUN | FRED FISCHER |
| | 56 | AQUA-LUNG PRO LINE COMPRO FIN | MARTY SNYDERMAN |
| | 122 | MORAY INDUSTRIES | |
| TREASURE DIVING | 32 | CLEANING AND RESTORING TREASURE COINS | ART EDELSTEIN |
| | | Electrolysis, acid baths and more | |
| | 52 | KEENE 2002 PORTABLE GOLD DREDGE | JIM WALKER |
| PHOTOGRAPHY | 36 | AUTOMATIC STROBES | JIM AND CATHY CHURCH |
| | 44 | TUSSEY'S PRO-LINE HOUSING | GERI MURPHY |
| FOREIGN TRAVEL | 73 | ANTHONY'S KEY RESORT | STEPHEN FRINK |
| | | Expanding on Roatan | |
| | 80 | DIVING DOCTORS DOWN UNDER | BARBARA CURRIE |
| | | HUB visits Heron Island | |
| | 88 | THE LAMMER LAW | NANCY FERGUSON |
| | | Sailing and diving the BVIs | |
| | 90 | THE FANTASEA | STEVE LUCAS |
| | | Red Sea cruiser | |
| | 96 | BOB SOTO'S SCUBA CENTRE | GERI MURPHY |
| | | Shore diving on Grand Cayman | |
| LOCAL DIVING | 61 | NEW YORK/NEW JERSEY DIVE GUIDE | JOE BERESWILL AND AL BOEHM |
| | | From Long Island to Atlantic City | |
| | 94 | MISSOURI RIVER DRIFT DIVE | DEANN DEKAY HILMOE |
| | | Fish, relics and buffalo heads in South Dakota | |
| MISCELLANEOUS | 84 | DANGEROUS DUDLEY DOES CAYMAN | STAN WATERMAN |
| | | Filming with a <i>skeleton</i> crew | |
| MARINE LIFE | 86 | HOW DIVERS CAN AID SCIENCE | DONNA MARIE VAUGHAN |
| | | Diver's logbook helps find living <i>Turritella</i> | |
| | 124 | BASIC GUIDE FOR CREATURE SEEKERS | DONNA AND CHRIS McLAUGHLIN |
| | | Slow down and look closely | |
| WRECK DIVING | 104 | THE OLYMPIC II | BONNIE J. CARDONE AND STEVE GILES |
| | | Once a star, always a star | |
| DIVE BOATS | 129 | AVON S 4.00 INFLATABLE | ERIC HANAUER |

- | | | | | | | |
|-------------|----|------------------|----|---------------|-----|-------------------|
| DEPARTMENTS | 8 | WRECK FACTS | 26 | Rx FOR DIVERS | 58 | FISH OF THE MONTH |
| | 11 | SCUBA QUIZ | 40 | TECHNIFACTS | 102 | NEW BOOKS |
| | 16 | DIVER'S CALENDAR | | | 132 | DIVER'S DIRECTORY |



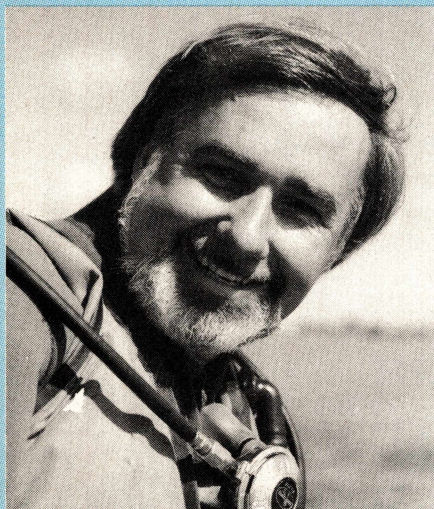
COVER

Diver David Loughnan examines beautiful broccoli soft coral off Heron Island on the Great Barrier Reef. Geri Murphy took the photo using a Nikonos III camera with 28 mm lens and Nikon Close-Up Kit, Oceanic 2001 strobe. F22, 1/60 second. For more information on Heron Island see page 80 in this issue.

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SDM Editorial

BY THE PUBLISHER



WHAT MAKES A GOOD DIVER?

The qualities and characteristics which help to make a good diver are generally more subtle than a string of fish and one has to be a sharp observer to spot them. For example, it is not the magnitude of a diver's sea stories nor the high grade on a final scuba course exam that proves an ability to dive. Instead, it is the diver's actions in and around the water that provide the clues: How he/she prepares for a dive, how he/she conducts himself/herself underwater, and how accident situations are avoided. Here are a few of the signs to look for:

Physical condition — Good divers keep in good physical condition so that they can enjoy their dives and avoid panic situations. If they plan to make an unusually strenuous dive or go on a lengthy dive vacation, they prepare by working out at the pool prior to the trip. Good divers also know when to quit for the day. They know the limit of their own physical endurance and will not push themselves beyond this regardless of how good the diving is.

Proper equipment — Good divers show up for a dive properly equipped. If it happens to be a cave dive, then they have the special tools for the job — such as safety lines and reels, underwater lights and pony bottles. There are a few basic pieces of dive gear that indicate the mark of a good diver: a submersible pressure gauge, a buoyancy compensator, a reliable depth gauge and an octopus rig.

Good divers also maintain and repair their equipment on a regular basis: Washing it at the end of a day's diving and doing a pre-check of all their gear at least two days prior to the next dive. This provides sufficient time to repair or replace damaged equipment.

Underwater orientation — Good divers know exactly where they are during every moment of their dives, taking careful mental notes of underwater landmarks, current direction and velocity and the time spent. They can always find the way back to the boat or beach and seldom surface more than 50 yards from their mark. Good divers also keep a careful check on tank pressure and turn around before the air is half gone. Their goal for

every dive is to return to the boat or beach with at least 300 psi remaining in the tank.

Buddy contact — "Never dive alone" is the cardinal rule of diving, but there is much more to the buddy system than being in the same ocean with another diver. Good divers maintain continuous contact with their buddies throughout the dive, either by visual or audio means. In some cases they have pre-arranged rendezvous points underwater, such as meeting a partner at the bottom of the anchor line before starting off across the ocean floor. Most important, good divers have a definite plan of action should they become separated from their partners.

Awareness — Good divers develop a "sixth sense" about impending trouble. They do this by maintaining a constant vigilance on those environmental factors which can contribute to a bad scene, for example: increasing surf, increasing current, signs of fatigue in a buddy, heavy surge, bad surface chop or the onslaught of nitrogen narcosis. Good divers, like good chess players, think ahead and when recognizing the signs of a problem, will generally avoid the situation by aborting the dive.

Pre-dive judgment — Knowing when not to dive is just as important as knowing how to dive. Good divers evaluate the dive site and water conditions long before making an entry. If the situation appears too hazardous because of storm surf, bad surge or other weather condition they abort the dive. The same holds true for their personal condition. If they have a bad cold, clogged sinuses or just don't feel quite right, then they cancel out rather than burdening fellow divers with the possibility of a rescue problem.

Final definition — If you had to sum it up in one sentence, I think the definition might be: "A good diver is a careful diver" (one who avoids trouble rather than one who is always struggling out of a tight squeeze). The next time you're out on a dive, take a look around you and see if you can pick out the good divers. Better yet, check yourself out on this test. ➤

Almost all new divers coming into our sport are eager to prove to themselves, and to their friends, that they are good divers — that they measure up to the highest standards of the sport. Quite often they will seek ways to test their mettle — perhaps some sort of underwater competition or accomplishment that will prove beyond a doubt their personal abilities and skills for diving.

In the early days of skin diving, a man proved his worth by the size and number of fish he speared. Look back through the old-time pages of skin diving magazines printed in the '50s and you'll find many photographs depicting beaming divers holding up strings of dead fish.

Breath holding and prolonged free diving were other early day measures of dive skill. They went hand in hand with spearfishing and many a practitioner spent hours clinging to the bottom of a swimming pool ladder in an effort to improve his breath holding time. That was until the medical people blew the whistle and showed us how hyperventilation and overextension could easily result (and often did) in underwater blackout.

An equally insane yardstick of the hero diver is deep diving with compressed air. An astonishing number of misguided people have met with tragic endings during scuba dives to 270, 300 and even 320 feet! In the eyes of most veteran divers and instructors, these deep diving fatalities were senseless, needless affairs because depth is certainly no measure of a person's diving ability.

If it is not fish speared or depth dived, what then is the criteria for a good diver? Or, more important, how do you spot a bad diver?



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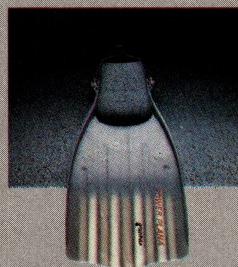
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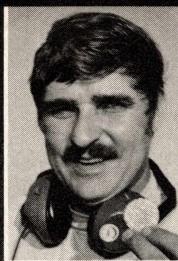
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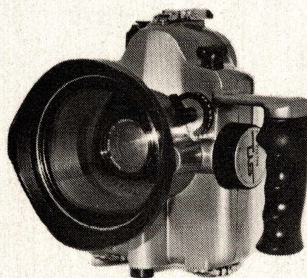
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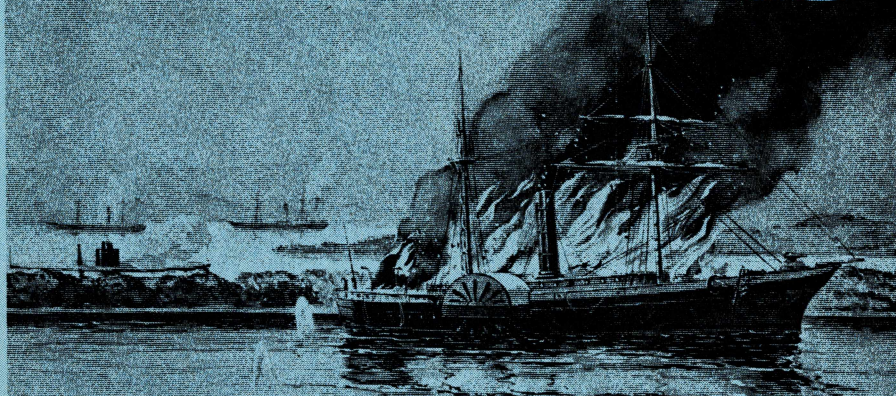


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Wreck Facts



BY ELLSWORTH BOYD

Employees at the Smithsonian Institution, Washington, D.C., completed the first inventory ever taken at the famous museum complex and found 100 million items—22 million more than they expected. Among the items accumulated over 137 years, they recorded seven million beetles, 2,000 stuffed brown bears, 114,000 bird eggs, the skeletons of 226 alligators, 1,600 political campaign buttons and a wad of tobacco carried by Robert E. Peary when he reached the North Pole in 1909. The shelf-by-shelf stock count took five years and cost \$8 million for salaries and computer time. Artifacts were counted in only 9 of the 12 museums. Officials say the count won't be accurate for long because the Institution acquires new things at the rate of one million per year. My question is: I wonder how many items are lying dust-covered in the storerooms and attics of the Smithsonian—the world's largest complex of museums—and of these, how many are shipwreck artifacts? If I ever find the answer, I will let you know.

Wade Holloway, Bay City, TX, let me know something that has been gnawing at his gut for a long time. He wants information on ships that were wrecked in the Gulf of Mexico, preferably along the Texas coastline, perhaps some that haven't been found yet. Let your spirit of adventure run its gamut, Wade and go for it! But, be patient because you've got some meticulous research ahead of you. First check the micro files of newspapers and libraries in large cities on the gulf. I see on my map that you are near Galveston and Corpus Christi, so you might begin there. Look for the sinking of a steamship named *Paisano* that was supposed to have gone down after the Civil War with some coins aboard. Steamships of that era took cotton to Mexico and often returned with gold and silver coins as payment. You might want to research the Devil's Elbow area of Padre Island where coins have washed in after intense storms. Try to locate these books if you can: *Blaze of Gold* by Dee Woods, Naylor

Company, San Antonio, 1942; *Treasure Diver's Guide* by John S. Potter, Doubleday, NY, 1960. (Both books are out of print.) Purchase a copy of: *Shipwrecks in the Americas* by Robert F. Marx, Bonanza Books, NY, 1983. You might want to drop a note to Mr. Magill, 1333 Annapolis Road, Corpus Christi, TX 78415. He knows a lot about wrecks in the area and might help you. Good luck and let me know what you uncover.

Deb Greenhalg, SECONN Dive Club, Ledyard, CT, sent me a wealth of information on diving wrecks off the New England coast. Deb writes: "A favorite site is the *Onondaga*, sunk in 1918 inside Watch Hill Reef, RI. A 2,696 ton freighter, she was carrying tires, women's shoes, china, bottles and many other souvenir treasures that divers like to retrieve. It is 50 to 60 feet deep and visibility averages 15 to 50 feet. Lobster, hake, cunner, eel and blackfish dwell in the wreckage and photographers find the sea anemones and soft corals nice backdrops for their pictures. We dive the S.S. *Olinda*, a steamer that sank in 1895, south of Fisher's Island, RI and the *Lightburne*, a Texaco tanker that ran aground southeast of Block Island. Experienced divers explore the steamer *Larchmont*, lying southeast of Watch Hill in 140 feet, with massive paddlewheels that stretch 70 feet from the bottom. We also dive the U.S.S. *Grecian*, a cargo vessel in 90 feet, and the *U-853*, a German U-boat sunk in 1945 with its full crew still aboard. Our club also charts out of state dives in Massachusetts, New Jersey and North Carolina." Divers may contact Deb at 13 Country Club Drive, Ledyard, CT 06339.

In response to my request for charter boat captains to let us know what wrecks they are diving, John DeMaio, South Windsor, CT, writes: "I'm enclosing a list of 15 wrecks that we dive on from the *Delta Queen*, my 30 foot, twin engine Chris Craft. We sail from Mystic with a maximum of six divers. I have a slide presentation for clubs or groups that want to see what some of the sites look like."

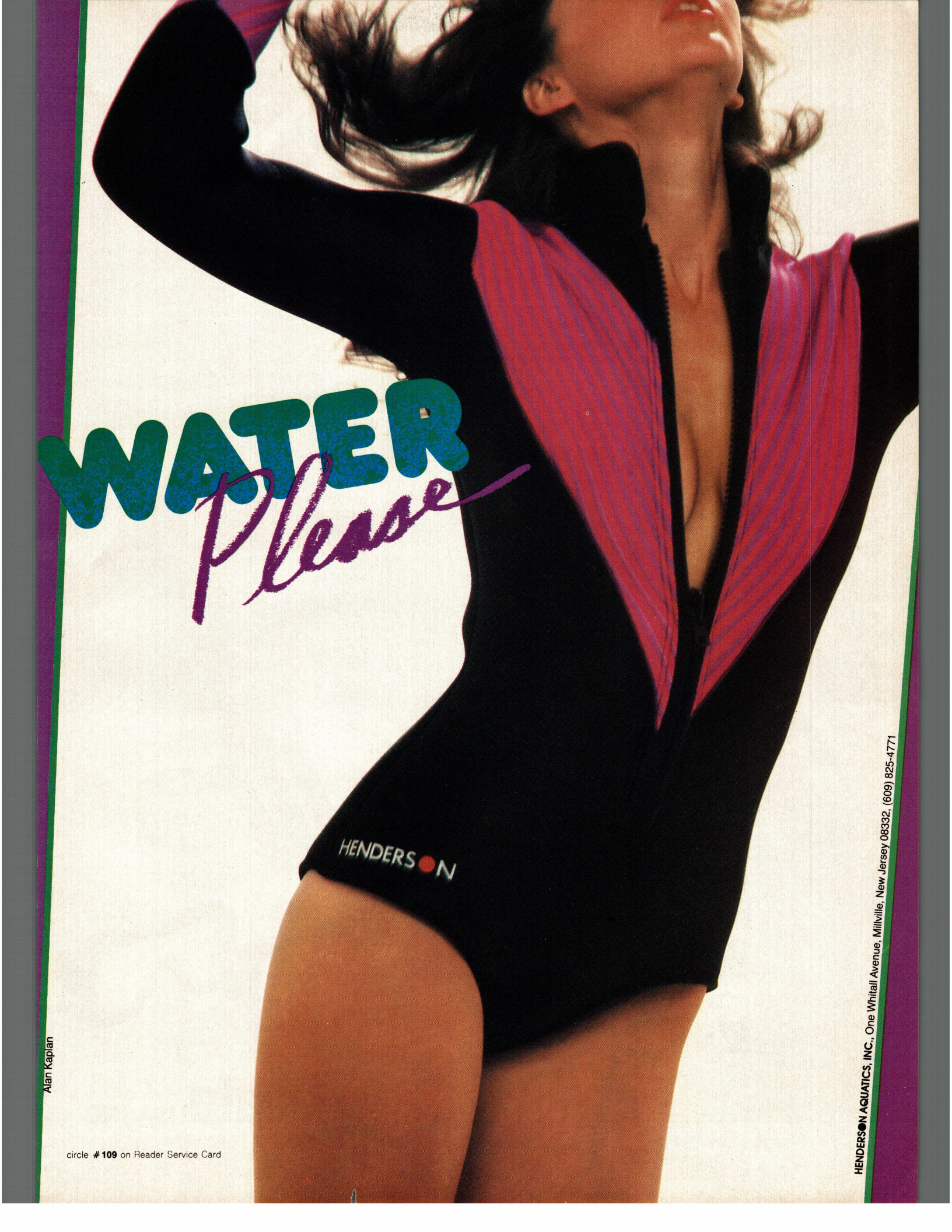
Contact John at 204 Twin Circle Drive, South Windsor, CT 06074.

Captain Fred Frommelt, Kenosha, WI writes: "The *Divemaster* is a 43 foot steel hulled dive boat with twin 255 hp engines, capable of 16 knots in most sea conditions. I am the captain and owner and a PADI master instructor. I always have at least one more instructor aboard, sometimes two, serving as crew. Lake Michigan diving is exciting, especially on the popular wrecks in the Milwaukee area. We also dive wrecks from the Sheboygan/Port Washington area in the north to the Racine/Kenosha area to the south. We dive seven days a week." Contact Fred at 426 Thirteenth St., Kenosha, WI 53140.

Divers continue to ask about books on Truk Lagoon and I continue to discover new, interesting sources. *Shipwrecks of Truk* by Philip Rosenberg is the culmination of the author's 400 dives and two years of writing about the Japanese ghost fleet of Micronesia. Rosenberg offers an in-depth visual account of the Japanese war losses and their cargo-filled holds. The color photos are outstanding, especially the bowgun on the *Amagisan Maru* and bridge of the *Fujikawa Maru*. Many of the photos from *Shipwrecks of Truk* have appeared in Life, Modern Photography, Oceans and International Wildlife magazines. The book may be ordered from: Parphoto, Box 31, Lafayette, CA 94549 for \$16.50. The author has volunteered to answer questions about the wrecks of Truk if divers will enclose a stamped, self-addressed envelope when writing to him: Philip Rosenberg, Box 1351, Kealahou, HI 96750.

It is difficult to locate books that list ships sunk prior to the 1800s, but Robert Marx has alleviated this problem with his hot-off-the-press edition, *Shipwrecks in the Americas*. Marx has selected significant wrecks in the western hemisphere from the time of Columbus until about 1825. Not only does the book go back to the 1400s, it covers the United States, Canada, Bermuda, the Bahamas, Jamaica, South America, Mexico and other popular shipwreck locales. The author also provides varied information on methods of pinpointing wrecks, salvage procedures and artifact preservation. The book, priced at \$11.95, is available from Bonanza Books, One Park Ave., New York 10016.

Kevin Firth, Canon City, CO, tells me that he wrote to Michigan Diver, P.O. Box 88011, Kentwood, MI 49508, and his letter was returned and marked, "non-deliverable, no forwarding address." Readers, please let me know if you have further information on this publication. Thanks for your help and safe diving to all. Ellsworth Boyd, Rt. 2, Box 408, White Hall, MD 21161. Please include a stamped, self-addressed envelope when writing for shipwreck information. ✉



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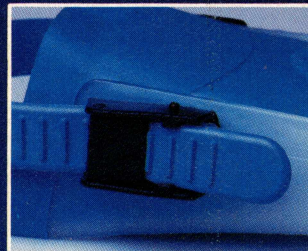
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Scuba Quiz

Category: Circulation

By Dennis Graver

The cardiovascular system undergoes changes underwater. By being aware of the changes and knowing why they occur, divers can better understand what happens to them. Knowledge of the effects on circulation underwater can also help prevent injury and accidents. Answer the true and false questions, then compare your answers with those on the next page.

1. The likelihood of a heart attack is no greater while diving than when exercising on land.

- ☐ A. True
☐ B. False

2. The amount of oxygen carried in the blood increases significantly with increased exercise.

- ☐ A. True
☐ B. False

3. Pressure on the neck, such as that from a tight hood, causes the heart rate to increase.

- ☐ A. True
☐ B. False

4. The diving reflex causes changes in circulation. The degree of response is determined primarily by the temperature of the water.

- ☐ A. True
☐ B. False

5. Blood pressure is lower underwater than on land.

- ☐ A. True
☐ B. False

6. Blood is shunted from extremities to conserve heat in the core of the body. This remains true no matter how cold the extremities become.

- ☐ A. True
☐ B. False

7. When blood is shunted from extremities to conserve heat, one result is increased urination (diuresis).

- ☐ A. True
☐ B. False

8. Alcohol increases circulation to the skin and increases heat loss.

- ☐ A. True
☐ B. False

9. Under pressure, enough oxygen can be carried by the blood plasma to meet the body's needs even if the oxygen carrying capability of blood hemoglobin has been significantly reduced.

- ☐ A. True
☐ B. False

10. With frequent exposure, it is possible to improve vasoconstriction and, therefore, tolerance to cold water.

- ☐ A. True
☐ B. False

11. Owing to the many effects on circulation caused by submersion, medical experts have determined that diving is unhealthy for the average person.

- ☐ A. True
☐ B. False

Scuba Quiz

Answers: Circulation

1. A. True. The blood supply to the heart, efficiency of its muscle contractions, changes in rate and rhythm and increased work load all result from diving. Such stresses can be tolerated by a healthy heart, but can cause a heart attack in those with coronary problems. A person with any heart disorder should not dive unless cleared by both a cardiologist and a diving physician.

2. B. False. The blood carries nearly as much oxygen as it can at all times. The change that takes place with exercise is in the circulation of the blood, which is increased to get oxygen to and waste products from tissues more quickly. Increased oxygen partial pressure while diving does allow more oxygen to be carried dissolved in the blood, but the benefit of this is offset by other cardiovascular changes.

3. B. False. The carotid sinuses, located at the bifurcation of the arteries on each side of the neck, are sensors for blood pressure and provide information to the brain to control heart rate. As pressure increases, the sinuses tell the brain to slow the heart. Artificial pressure, such as a tight hood, also results in slowing of the heart. This can be dangerous, can lead to blackout and must be avoided.

4. A. True. The diving reflex is much more pronounced in marine mammals than in man, but its effects have been documented and include cardiovascular changes. The controlling factor seems to be the temperature of the water in contact with the face. The colder the

water, the greater the effect. It should be noted that the effects of the diving reflex are not always beneficial. Diving in very cold water places quite a strain on the circulatory system.

5. B. False. Rapid loss of body heat can occur in water. To reduce the loss, the body reduces blood flow to the skin and extremities. This vasoconstriction results in a greater volume of blood in the torso, increasing blood pressure slightly. Weightlessness in water also reduces the pooling of blood in the legs. Higher blood pressure is not a problem except for those who already have such difficulties.

6. B. False. As explained in the previous answer, vasoconstriction is the body's defense against heat loss. However, when the skin temperature of an extremity drops below 50°F circulation is pathologically restored to the extremity owing to failure of constriction. This is called "cold induced vasodilation," is undesirable and is potentially hazardous because the heat lost from the body is very great when the vasodilation occurs. Insulation of the extremities is needed in very cold water to prevent hypothermia.

7. A. True. In cold water, diuresis occurs because the volume of blood in the trunk of the body is increased. This means the blood passes through the kidneys in greater amounts, so the need to urinate is more frequent. Incidentally, the negative pressure breathing of diving is also diuretic. If you feel you urinate excessively when you dive, don't worry, you are only normal!

8. A. True. Alcohol causes vasodilation, which is just the opposite of the effect created in the body as a reaction to cold. Drinking before diving inhibits the system's heat loss defense mechanism, while drinking after diving may release nitrogen trapped in cold extremities and contribute to the bends. Teetotaling divers have good justification for their abstinence.

9. A. True. Higher partial pressures caused by depth increase the amount of oxygen in the bloodstream. This explains why the effects of carbon monoxide toxicity are experienced during ascent—when the partial pressure of oxygen is decreasing—rather than when the afflicted diver is at depth. If you are not feeling well, be sure to have someone ascend with you because loss of consciousness is quite possible on the way to the surface.

10. A. True. Studies of the Ama divers of Japan have shown this to be true, and I and others I know will also vouch for it. Isn't it nice to know that the more you dive the more comfortable you will be? This is a great excuse to justify diving on a regular basis.

11. B. False. While diving does require participants to be in good health, the medical community does not suggest that it is harmful for healthy persons. What is known, however, is that those with cardiovascular problems are much more likely to experience difficulty while diving than they would otherwise. A person with circulatory problems should consult a diving physician before diving.

In spite of all the studies and research on the physiological effects of diving, there is much more unknown than is known. What is known is that very good—not just marginal—health is an absolute necessity. If you will read some of the excellent books available on diving medicine, you will find that diving is not just another form of exercise and cannot be compared strictly on the basis of exercise requirements. Physical exams, with emphasis on the cardiovascular system, are recommended at least every two years and annually for those over 40 years old.

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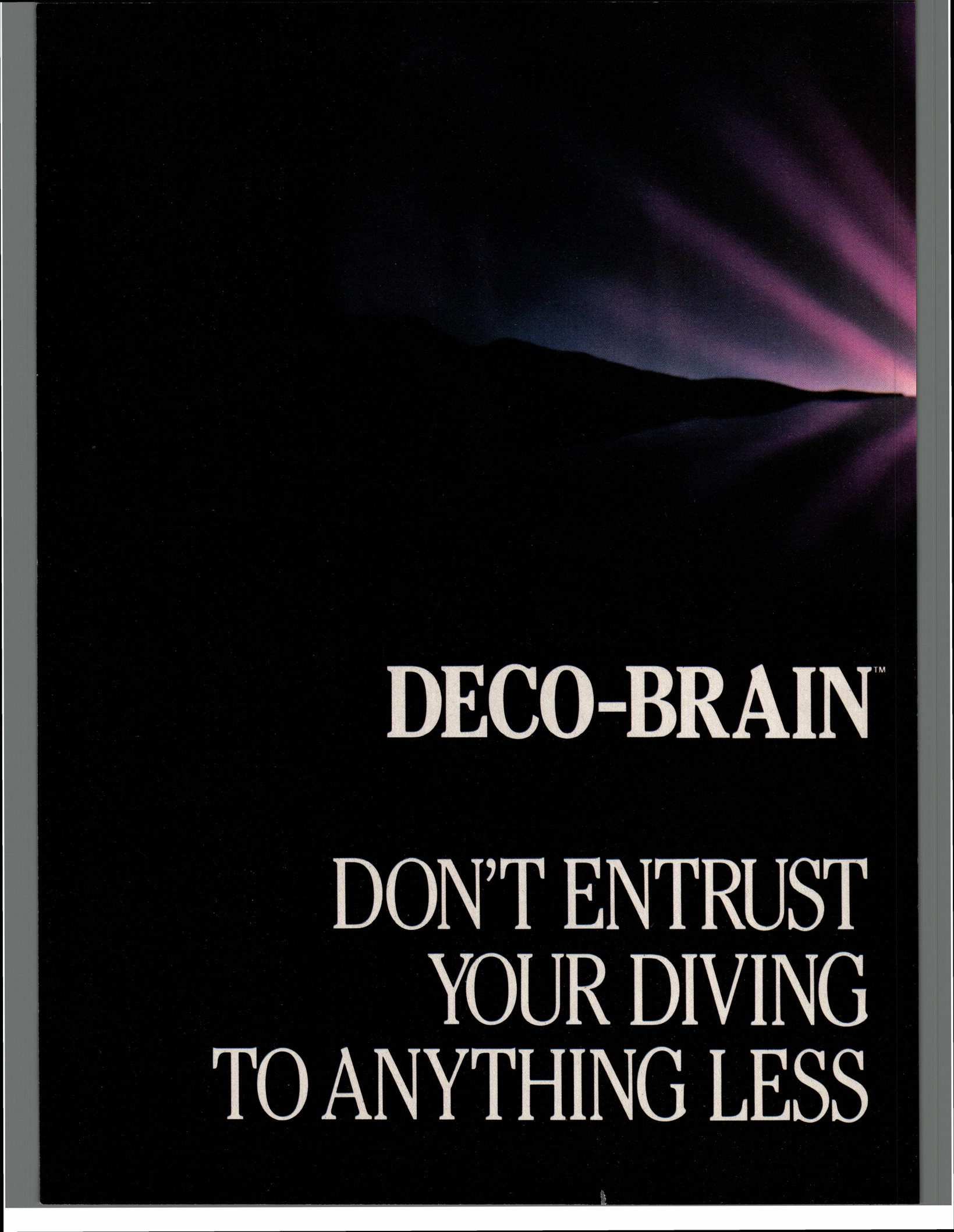
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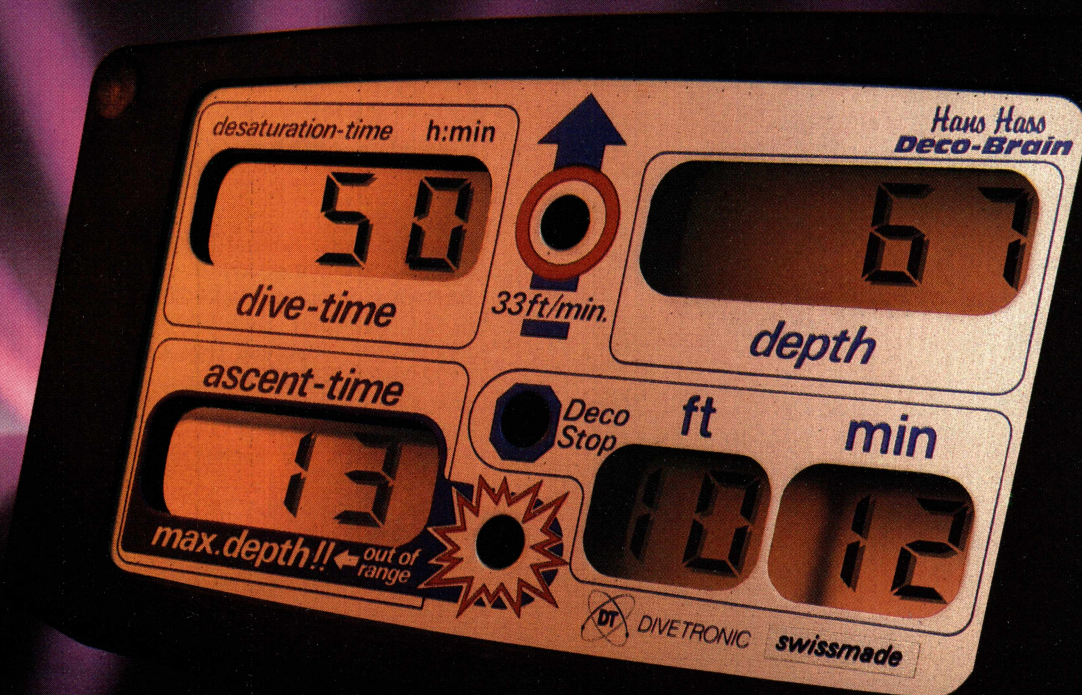
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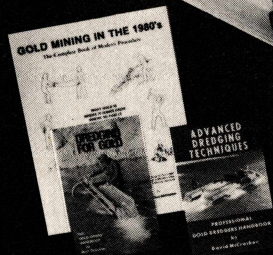
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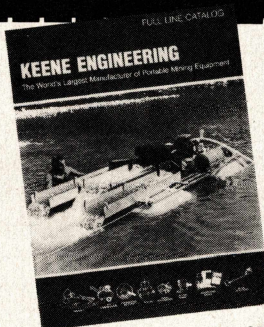
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Diver's Calendar

June 9-10 Aqua-Nut Divers Fourth Annual Treasure Hunt at Blue Springs in Waldron, IN. Prizes, film festival, photo contest, hog roast and night dive. (Contact: Joe Chambers, Aqua-Nut Divers, R.R. 1, Box 153-C, Clinton, Indiana; (317) 832-9930)

June 16 Second Annual Trash 'n Treasure Dive, sponsored by the Atlantean Underwater Society at Lake Tenkiller, Vian, OK. (Contact: Don Morgan, 6229 Kingsbridge, Oklahoma City, Oklahoma 73132; (405) 722-2877)

June 17-23 Aquatic Sports Show at the Great Exhibit Hall, New Orleans World's Fair. (Contact: Judi Bailey, in New Orleans, (504) 561-1219)

July 7-8 Fourth Annual Monterey Beach Dive Photo Competition. (Contact: Don McMahan, UPS/Northern California, 15750 Via Coluso, San Lorenzo, California 94580)

July 15-October 15 Ocean Poets will review manuscripts of divers' poetry for a planned anthology "The Scuba Diving Experience." Poets should send no more than five poems, 40 lines maximum: category A—free style; category B—ballads. (Contact: Ocean Poets, Suite 740, 507 Third Ave., Seattle, Washington 98104-2355)

July 21-22 Third Annual Wisconsin Dive Jamboree. Treasure hunt, campfire slide show, fish boil, volleyball and tug of war. Sunday activities held at Sunset Park, Sturgeon Bay, Wisconsin. (Contact: Badger State Divers Club, P.O. Box 505, Waukesha, Wisconsin 53187 or telephone (414) 762-3175)

September 7-8 San Diego Underwater Film Festival, San Diego, CA. (Contact: Dee Miller (619) 287-4155)

September 8-9 First Annual Underwater Fun Festival sponsored by the Klamath County Dive Rescue Team. Contests, night dive, chili feed. (Contact: Klamath County Dive Rescue, c/o Sheriff's Department, Court House, Klamath Falls, Oregon 97601)

September 9 Fifth Annual Divers Swap Meet, sponsored by the Santa Ana College Dive Club at the college pool. Everyone welcome, no fees. (Contact: Jim Taylor, 22011-J Rimbhurst Dr., El Toro, California 92630)

September 9-14 Marine and Diving Medicine: includes diving workshops, marine biology labs, ear and eye in diving. Appledore Island, Isles of Shoals, Main. Co-sponsored by Colby College and the Undersea Medical Society. (Contact: R.H. Kany, Director of Special Programs, Colby College, Waterville, Maine 04901)

A black and white photograph of three divers underwater. They are wearing Sherwood regulators. The diver in the foreground is wearing a regulator with the 'BRUT' logo. The diver in the middle is wearing a regulator with the '4000' logo. The diver in the background is wearing a regulator with the 'MAGNUM' logo. Bubbles are visible around the divers.

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For the past three years, Cayman Islands dive operators have pulled out all the stops in putting on an event which should be marked on the calendars of dive shop owners and managers throughout North America: Scuba Bowl. This is a week long event, both educational and entertaining, for dive shop management who: wish to know more about diving in the Cayman Islands; need more information on how to successfully market Cayman as a premier dive destination; wish to learn more about underwater photography in the promotion of dive destinations; and who like to enjoy themselves in the company of people from all over North America who are in the same business.

Scuba Bowl 84, to be held September 29-October 6, will follow the same format as in previous years. Each morning will be given over to lectures and seminars on all aspects of marketing a dive destination with emphasis on the Cayman Islands; what the Islands have to offer the diver and why the Cayman Islands are so highly acclaimed as a dive destination. In past years, Al Hornsby, vice president of PADI and well versed in dive marketing, has been a keynote speaker at Scuba Bowl. Paul Tzimoulis, Publisher/Editor of SKIN DIVER Magazine, has given his informative and entertaining lectures on underwater photography at every Scuba Bowl event held. Both have agreed to attend Scuba Bowl 84. In addition to the keynote lecturers there will be other interesting guest speakers.

Afternoons will be spent diving Grand Cayman's best sites. Participants will make a one tank wall dive with a different operator each day and have the opportunity to meet the proprietor as well as instructors and divemasters. It is anticipated that there will be at least one night dive as well.

The third element of Scuba Bowl 84 will be the entertaining and enjoyable socials held each evening at a different resort. In past years these relaxing evenings have proved most popular as they give participants the opportunity to meet others with similar problems and aspirations in an informal atmosphere.

Participation in Scuba Bowl 84 will be limited to a maximum of 100 persons. This will ensure that there will be no over crowding at any of the lecture sessions, the socials or on the boats. The host hotel for this year's event will be the recently refurbished Royal Palms.

For information contact Linda Riemen-snider, Cayman Islands Depart. of Tourism, 250 Catalonia Ave., Suite 604, Coral Gables, FL 33134; (305) 444-6551.

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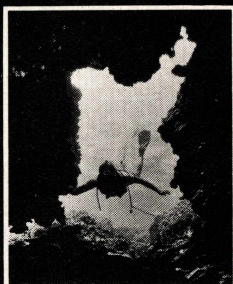
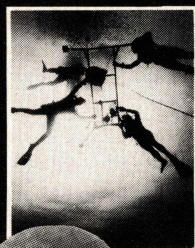


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NATIONAL SCUBA WEEK

By a recent joint resolution of the U.S. Senate and House of Representatives, the week beginning June 11, 1984 has been designated National Scuba Week. The reasons given for this designation are as follows: Scuba diving is one of the country's fastest growing sports (there are now 2,500,000 scuba divers in the U.S.); close to 100,000 people are employed in the scuba industry; about \$600 million in revenues were generated in 1983 by the scuba industry; scuba diving can be done anywhere in the world and can be used for special purposes such as U/W photography and scientific research; the public's awareness of scuba diving has increased greatly through the research and educational pursuits of Jacques Cousteau, whose birthday, as well as the anniversary of his first testing of the Aqua-Lung, fall on June 11. 🐠

TZIMOULIS/WEBFOOTED WARRIORS

Paul Tzimoulis, editor/publisher of SKIN DIVER Magazine, has been elected to charter special membership in the Webfooted Warriors Association. Members are or were on Navy UDT or SEAL teams. The association feels Tzimoulis' membership is appropriate as recreational scuba diving owes much of its heritage to equipment and techniques originally developed for military use. 🐠

SCUBA NATIONALS IN FLORIDA

The National Scuba Championships, sponsored and sanctioned by the Underwater Society of America, will be held at Islamorada, in the Florida Keys, July 6-8. The Southeast Florida Diving Council will be the host.

The competition includes scuba skills and spearfishing. Competitors must be members of the U/W Society of America.

More information may be obtained from Ray Lang, President of the Southeast Florida Diving Council, Miami, Florida (305) 595-2010 or (305) 253-2931; or Mac Heard, Director of Scuba Competition, Underwater Society of America, Farmington, New Mexico, (505) 324-5341. 🐠

SLR PHOTO COURSE

There is now an underwater photography course designed specifically for SLR camera owners—taught by Gale and Sylvia Livers in the waters of the Bahamas at the Chub Cay Club. This is the second year the Livers have taught this week long course. Classes are currently scheduled for the week of Oct. 6-13 and 13-20. Class size is limited to 14 students for individual attention.

For information regarding the course, write Gale or Sylvia Livers, P.O. Box 88719, Indianapolis, IN 46208. 🐠

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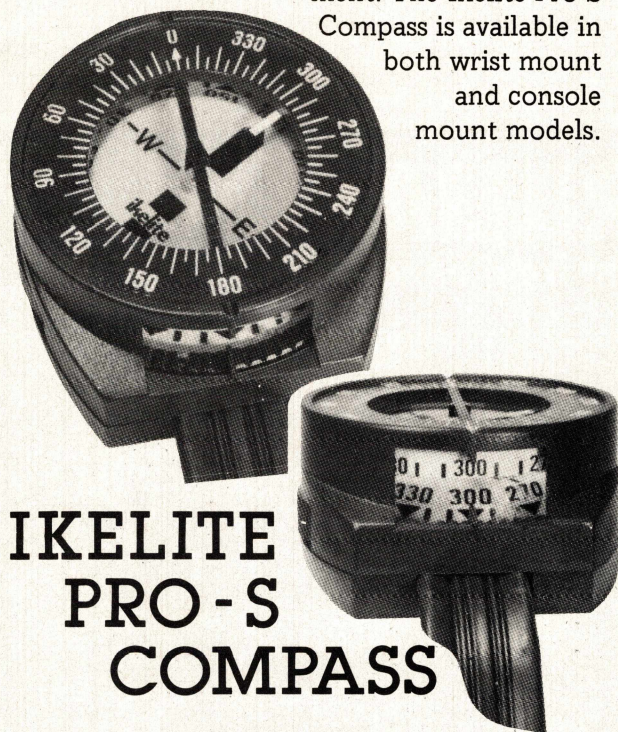
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Compass is available in both wrist mount and console mount models.



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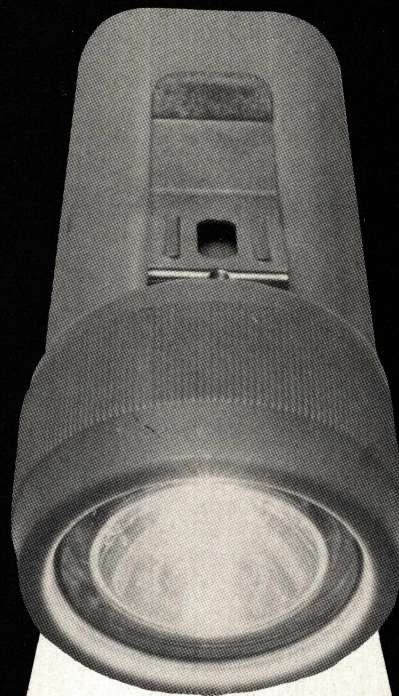

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TEXT AND PHOTOGRAPHY
BY GERI MURPHY



Have you ever wished for a camera case that could be taken on an open dive boat, subjected to salt spray, post dive camera drippings and saltwater residue without harm to its interior? Does it frustrate you to find your fully assembled camera and flash rig will no longer fit in its original travel case?

If these thoughts have crossed your mind, I suggest you take a look at the new Whale Bag just introduced by Creative Whale of West Chicago. Here is an

underwater camera carrying bag that can solve both of the problems mentioned above simultaneously and costs less than half the price of an average camera case.

The Whale Bag is the brainchild of Dick Jacoby, a well known underwater photography instructor, symposium lecturer and president of an underwater photographic sales company called The Creative Whale. Drawing upon his years of practical experience in the field, Jacoby has recently begun developing a line of

practical underwater photo accessories.

One is immediately struck by the fashionable look of the Whale Bag. It is bright blue with white trim, zippers and carrying straps. These give it a very snappy appearance. The bag looks larger and longer than the normal camera carrying bags found in most photographic stores. Best of all, it looks as if it will wear well on dive boat and beach excursions.

The bag is made of 11 ounce Du Pont Cordura nylon and is 18 inches long, 10

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600 miles north of the Arctic Circle, a Canadian ice breaker cuts a trail in the search for the HMS Breadalbane.



Searching for a shipwreck under the Arctic ice is not for ordinary divers. Or ordinary watches.

Temperatures reach 50° below zero. The wind chill factor: -100°F. Ice floes are a constant hazard.

For Dr. Joe MacInnis, the conditions were perfect.

In this hostile world lay a unique treasure: the HMS Breadalbane, a three-masted British barque lost in 1853 during the search for the Northwest Passage. MacInnis was determined to find her.

Using delicate sonar, he was able to pinpoint the location of the vessel 340 feet below the surface, near Beechey Island. Divers discovered one of the most perfectly preserved shipwrecks found in any ocean.

In the Arctic, ordinary divers find it difficult to function. So do ordinary watches. For the past 15 years, Dr. MacInnis, the first to dive and film under the North Pole, has chosen one watch: the Rolex Submariner.

"I've worn it everywhere. From the North Pole ... to the Red Sea."

As for the future, there are still more explorer ships resting on the Arctic floor.

A fitting challenge for Dr. Joe MacInnis and his Rolex.

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WHALE BAG

inches wide and 12 inches high. It is sufficiently roomy to accept an Ikelite underwater housing, a Nikonos with flash or a small underwater video rig. Yet the bag is still compact enough to fit under an airline seat as carry-on luggage, as long as you don't overpack it.

A single 24 inch long nylon YKK zipper runs the full length of the bag top and down both ends for maximum entry capability. This important feature allows the user to slip bulky, awkward camera assemblies into the bag with ease.

A single six inch high cloth/foam divider forms two compartments inside the bag. The foam reinforced cloth helps to keep hard metal parts from bumping and rubbing against each other. Velcro® fastening strips along both ends and the bottom of the divider allow it to be removed for washing or to allow the inside of the bag to be a single giant compartment.

The sides and bottom of the bag are fully lined with a one-quarter inch thick semi-soft plastic foam padding for protection. The foam is just stiff enough to give an upright form to the bag but soft enough to absorb the shock of bumps and jolts. This interior padding is completely water resistant and impervious to salt corrosion. You can place saltwater

soaked camera gear in the bag after the dive and then wash both the gear and bag after the day's activity. A one-quarter inch diameter brass hole, in the center of the bottom, allows drainage. The foam padding can be quickly removed from the bag for freshwater rinsing.

The carrying handles on the outside of the bag are two inch wide polypropylene webbing. They run completely around the sides and bottom of the bag for maximum strength. The handles fasten together at the top of the bag by means of a five inch long Velcro fastener pad which becomes a comfortable handgrip. The loops on the carrying handles are large enough to slip over your arms and shoulders and transform the bag into a backpack.

In addition to the carrying handles, there is an adjustable and removable shoulder strap which allows the user to carry the bag and still have both hands free. The shoulder strap is also made of two inch wide polypropylene webbing and contains a slide ring for adjusting length. The strap's maximum length is approximately 40 inches—long enough to fit over the shoulders and back of even the largest diver. Spring loaded belt snaps on each end fit into triangular D-rings on both ends of the bag. The strap can be easily removed and stored inside the bag when not needed.

A medium-sized utility pouch is on one side of the bag. It measures eight inches

high by ten inches long and is held closed at the top by a five and one-half inch long Velcro strip. This pouch is handy for carrying a dive logbook, the shoulder strap or other accessories.

On the other side of the bag there is a larger and more independent saddlebag. It is 10 inches high, 13 inches long and has its own zipper along the top. This saddlebag is removable and can be used as a separate carrying bag or briefcase. It is held onto the main bag by two large, 10 inch long strips of Velcro and metal snap fastener. This bag is large enough to carry a legal sized notepad, a soft cover fish identification book or a standard sized three-ring binder (one-half inch spine). The saddlebag can be stored inside the Whale Bag if necessary. It has its own polypropylene loop handle.

As a finishing touch, the side of the bag carries a small plastic see-through pouch in which a personal business card or I.D. card can be inserted for identification.

In testing the Whale Bag, SDM found it to be simple in appearance but loaded with subtle features which make it highly desirable for underwater photographers.

At a retail price of \$49.95 the Whale Bag is an excellent value. For more information, write or call: The Creative Whale, 940 E. Roosevelt Road, West Chicago, IL 60185. The U.S. toll free telephone number is: (800) 323-9483; in Illinois, Alaska or Hawaii call: (312) 231-3301. 

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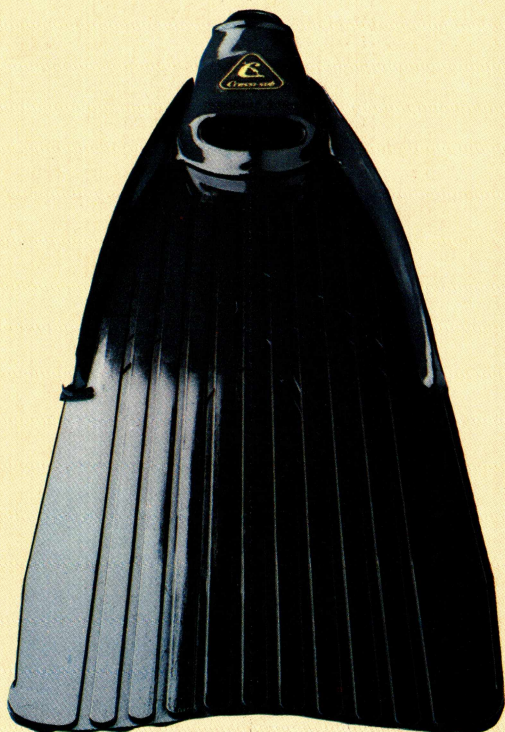
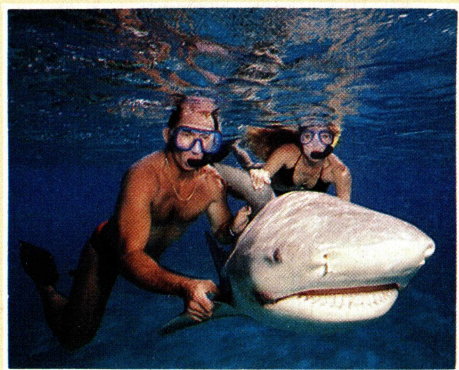
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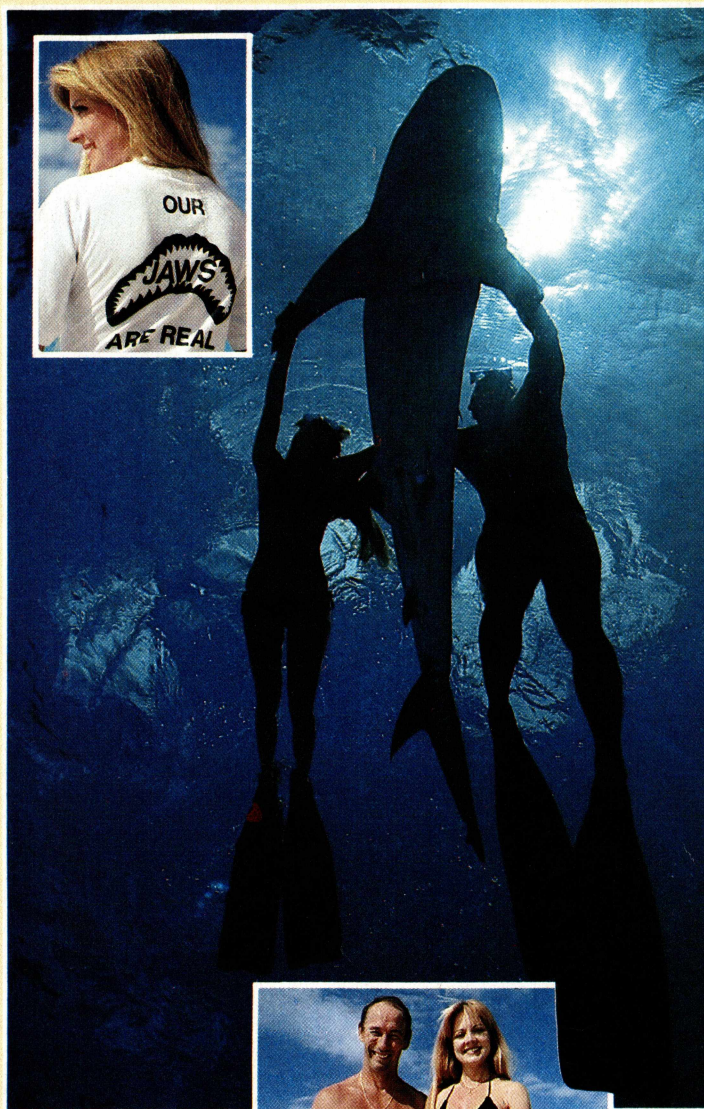
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Rx

FOR DIVERS

BY FRED BOVE, M.D., PH.D.

How many times have you visited your doctor to obtain advice or information about diving medicine or about some medical problem associated with diving, and got a blank stare in answer to your question? It is not uncommon to find that your doctor doesn't know anything about diving medicine. There is little or no teaching of diving medicine during schooling or residency because of the press of so many other important subjects. It is likely that your doctor won't be able to help you with your problem.

There is hope, however. Because of the need for doctors in the Navy, in commercial diving, in hyperbaric medicine and in some areas of marine research, some physicians have been able to obtain training in diving medicine.

The oldest and most prestigious diving medicine program is the medical officer diving and submarine medicine course given by the Navy. Many of the physicians who contributed to the research we take for granted today are graduates of that program. Much of the information which we use today to dive safely was produced by doctors who came from that school. Presently, the Navy diving and submarine training program graduates 20-30 new diving qualified physicians each year. The program includes submarine medicine and an eight week course which includes diving with hardhat and scuba, chamber operation and all of the theoretical material needed to practice as a qualified diving physician.

Although this program is available to qualified physicians, it requires that the doctor join the Navy. It is unlikely your local doctor can be talked into this program just to answer your questions.

Another military program, although on a smaller scale, is the hyperbaric medicine training program given by the Air Force at the school of aerospace medi-

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Rx FOR DIVERS

cine. Again, you would lose your local doctor to the Air Force if you convinced him (or her) to take that program.

A third way to become a diving doctor is to attend the course in diving medicine given each year by the National Oceanographic and Atmospheric Administration (NOAA). This is a three week combined classroom and diving program designed to train civilian doctors as diving medical consultants, able to provide treatment for diving accidents, run a hyperbaric chamber and dive. Information about the NOAA course can be obtained from the Undersea Medical Society, which helps to run the program: 9650 Rockville Pike, Bethesda, MD 20814.

The three courses described above will provide a physician with enough information to become a well qualified consultant in diving medicine. Most of the recognized experts in the field of diving and hyperbaric medicine in the U. S. have been trained in one of these programs.

Most physicians, though, don't want to take the time necessary to be trained this well. A short introductory course would be adequate for most family physicians and this is the most reasonable approach for those who don't want to make a career out of diving medicine.

Because of this need to train physicians at an introductory level in diving medicine, a number of short courses have been developed. These are usually a week long and provide an opportunity to dive as well. These courses are advertised in medical journals and many are sponsored by the Undersea Medical Society, which is responsible for their content and quality. Such programs can be attended by physicians, nurses, physician assistants and others, although they are designed to provide a high quality medical review of the field of diving and hyperbaric medicine. The non-physician may need some preliminary study before attending the program.

A typical example is a course we conduct in conjunction with Temple University Medical School every January in Grand Cayman. We provide 26-28 classroom hours, for which continuing education credits (Category 1) are provided. The course covers all aspects of diving physics and medicine. It includes lectures on toxic marine animals, drowning, decompression sickness, etc. and provides the introductory material needed for a physician who does not plan to practice diving or hyperbaric medicine, but wishes to have the knowledge of this field needed for an occasional question or problem. Our course is but one of many given year-round in many different locations. The courses are not designed to

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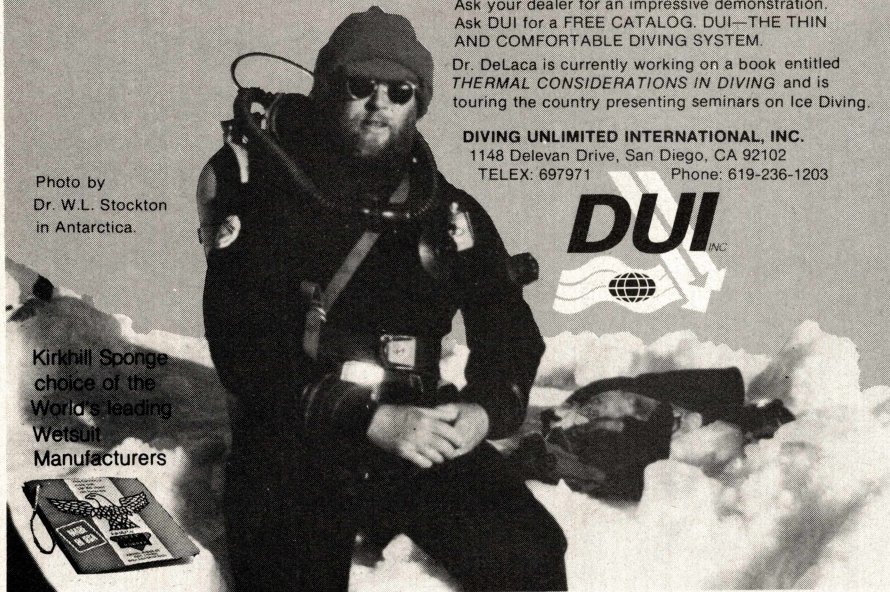
Dr. DeLaca is currently working on a book entitled *THERMAL CONSIDERATIONS IN DIVING* and is touring the country presenting seminars on Ice Diving.

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produce fully qualified diving physicians. The longer programs described above are needed to accomplish this goal.

You can recommend one of these one week programs to your physician. In fact, you should get him or her interested in taking a local scuba course. Once your doctor is hooked on diving, you can be sure you will get well informed answers to your diving medical questions.

If you can get one local physician to become informed about diving medicine, you will have a reliable source when you need it. If you don't have this resource available in your community, it is well worth the effort to interest your doctor in diving and diving medicine.

RESCUE WORKSHOP STAFF

Scuba instructors and assistant instructors interested in being on the staff of this year's Sonoma County Diver Rescue Workshop will meet Friday, October 5 at the Santa Rosa (CA) Junior College pool to begin staff training. On Saturday, October 6, lectures and discussions will be held 8:00 am to 1:30 pm and pool work from 2:30 pm to 5:00 pm. A staff dinner will be held at 7:30 pm. The ocean rescue workshop will be held on Sunday, October 7 at Fort Ross Cove.

Prospective staff members should have current insurance. A donation of \$17.50 includes T-shirt, lunch and the staff dinner.

For information send a self addressed, stamped envelope to Bruce Brown, P.O. Box 947, Diamond Springs, CA 95619 or call (916) 626-6859.

PHOTO COMPETITION

The California Beach Dive Photo Competition (sponsored this year by the Underwater Photographic Society of Northern California) will be held July 7-8. Pre-registration is \$30, on site it is \$40.

Registration will be 8:00-9:00 am on Saturday, July 7 at the Aquarius Dive Shop on Del Monte Blvd. in Monterey, CA. Film will be distributed at the check in, together with a map of the dive locations and further instructions.

From 9:00 am to 2:00 pm the contestants make a beach dive to expose their rolls of film. A complimentary dinner follows in the evening. Selection of entries, judging and the awards ceremony will be held Sunday morning.

Competition divisions include novice, amateur and open, divided into macro; marine life, normal lens; marine life, wide angle lens; humorous; and above water categories. There will be individual and team awards.

For further information and entry contact: the Underwater Photographic Society, c/o Kathleen Rosenberg, 15750 Via Colusa St., San Lorenzo, CA 94580.

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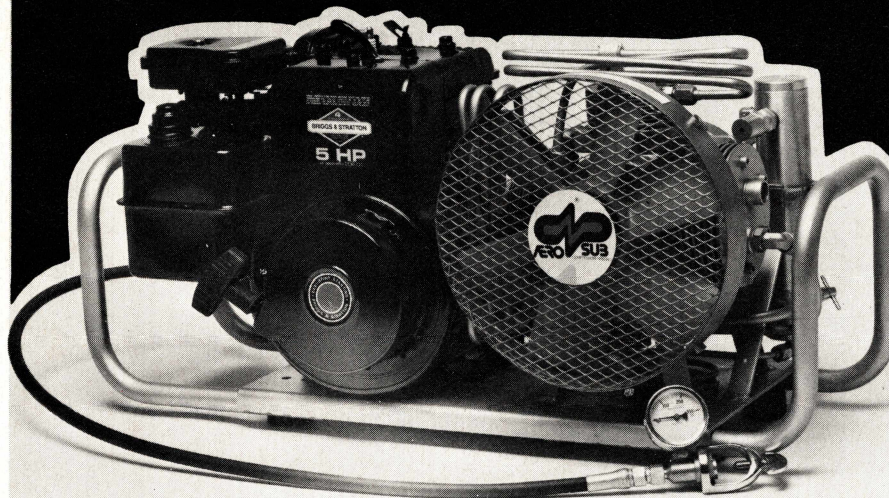


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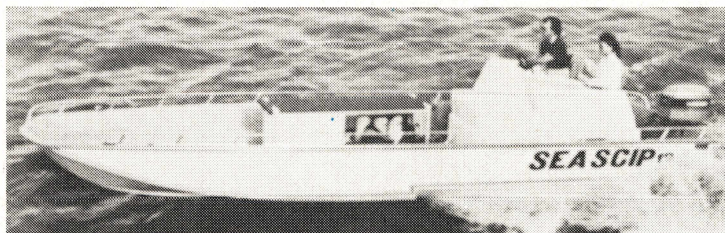
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Treasure Trans- for- mation

BY ART EDELSTEIN

In the spring of 1979 Ken Aiken read a magazine article about the rediscovery of the Spanish treasure galleon the *Concepcion*. He quickly contacted the parent company and treasure hunt sponsor, Sequest International, Inc. By September Aiken had begun working on the treasure of the *Concepcion*.

Operation Phips II (the code name for the second *Concepcion* salvage attempt) began scooping up thousands of silver



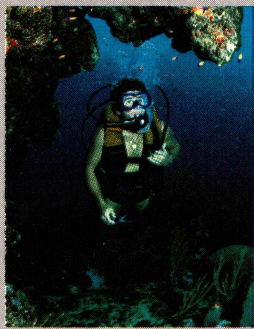
photos/Ken Aiken

coins from the sands and coral of the Silver Shoals reef. As more and more coins emerged from the depths the problem of cleaning and restoring the find for marketing purposes became enormous. Aiken's expertise in this area made him a natural for the job.

Ken Aiken is not a treasure hunter, but his talents are in great demand by professional treasure salvors. Ken is a jeweler by trade and a specialist in the restoration of treasure coins and ancient artifacts.

In small treasure finds, with only a few coins to clean, chemical baths or an electrolytic process work fine in the hands of an expert. Although these methods are slow, with a few coins this is not a serious drawback. However, with the huge haul of 63,000 coins from Phips II, these older methods proved slow, inefficient and costly. Aiken became the man in charge of supervising the treasure restoration and later he helped develop the marketing of the coinage from the wreck.

This was not Aiken's first hands-on experience with treasure coinage and the problems of restoration. In the fall of 1977 Ken helped International Coins and Cur-



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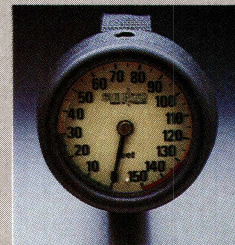
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TREASURE COINS

rency of Montpelier, Vermont with a similar problem. ICC had purchased thousands of coins from the Plate Fleet Wreck of 1715 which was salvaged off the East Florida coast. Unable to clean away the two and one-half centuries of chemical crud on the coins, they requested the services of Ken Aiken, who lives nearby. Ken was successful in restoring these coins to a marketable condition.

With his background in ancient metal-working techniques, jewelry manufacturing, ancient coins and restoration, Ken Aiken finds working on these artifacts an exciting occupation. I've asked him to outline some of the methods that he uses to clean and restore these treasures.

"I'd like to first define what I mean by cleaning versus restoration. By cleaning I refer to the removal of all foreign substances from a coin or artifact, whereas restoration means to return an item to its original condition. Returning an item to its original condition necessitates knowing what it is supposed to look like, the composition of the alloy and its properties and how it was made."

The condition of a treasure coin will depend on the ocean bottom environment it comes from. A coin found on a sandy

bottom in saltwater will usually not clump together with other coins. Each coin becomes encased in corrosive elements. This was the problem with the Plate Fleet coins Aiken restored in 1977. While many of the *Concepcion* coins were found in



this condition, many more sank onto the coral reef where they became overgrown with coral.

Aiken says, "Before attempting to clean an item you have discovered there

are two important steps. One is to determine, as best as possible, what the item is and the other is to determine what it is made of."

The diver or coinshooter who finds a coin of silver, copper or bronze may have a difficult time determining his find—the coin will have been greatly affected by the chemical action of the saltwater. Aiken says that these coins often look like "Oreo cookies." Gold coins, on the other hand, change very little and a diver usually has no trouble identifying them.

"After identifying your find it is time to determine the composition of the corrosion on the item. Although this sounds difficult it generally is not. The mixture of the various corrosive elements on, say a silver eight reale (piece of eight), is called verdigris; a black color indicates silver sulphides, green that of copper carbonates, blue is usually a copper sulfate, and white is calcium carbonates from coral and shells. Each type of compound can be removed with the appropriate chemical acid or alkaloid.

"The two primary methods of cleaning coins are by electrolysis and by acid baths. In electrolysis, a low voltage, high amperage direct current electrical charge is conducted from a stainless steel plate through an electrolytic solution to the coin, which is connected to the electrical source. As a result of this an efferves-

(Continued on Page 116)

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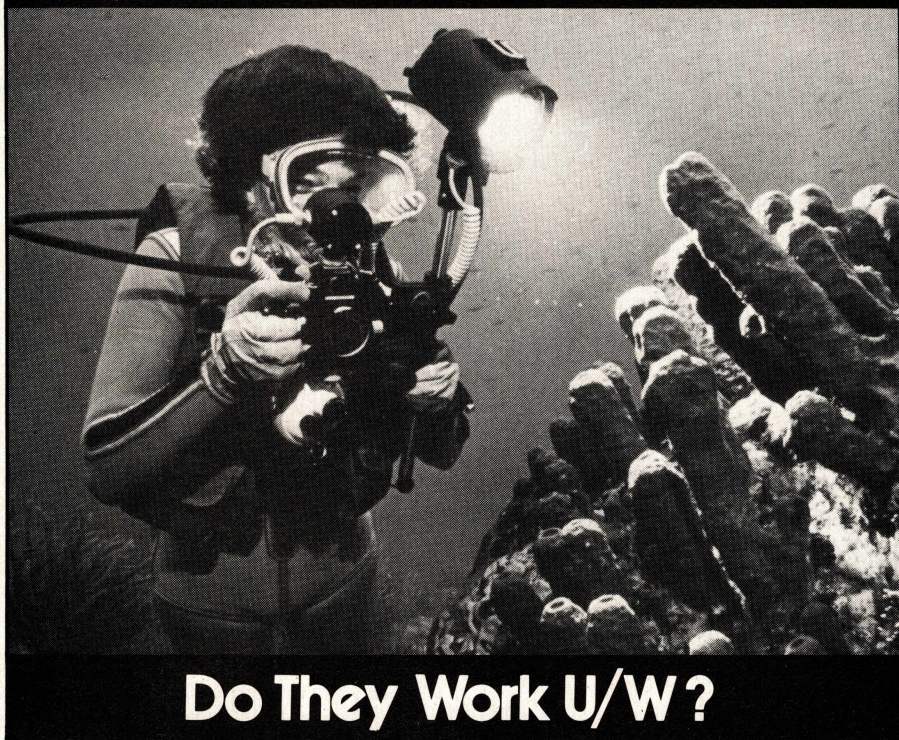
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Automatic Strobes



Do They Work U/W?

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

When considering any automatic strobe, your first question should be, "Is this strobe compatible with my camera?" This is usually determined by the connector system (such as Ikelite, Nikonos, SeaLoc or EO). However, with TTL or OTF systems (which we will discuss in the text), certain strobes are often only compatible with certain cameras.

After you are assured of compatibility, or interchangeability if you have more than one camera system, examine the strobe's specifications carefully. Once you know its features, you can predict what lighting techniques you can use.

HOW AUTOMATIC STROBES WORK

Automatic strobe exposures are determined by flash duration. The burst of light from the strobe strikes the subject and reflects back to a sensor in or near the camera. When enough light has reflected back from the subject for a proper exposure, the sensor signals the strobe to turn off. The only exception (to our knowledge) is the MCD TTL strobe. It operates by intensity rather than duration.

THE SENSOR

The sensor is the eye of the system. And, because it measures the amount of

light reflecting back for the exposure, its sensitivity and placement are important.

Some conventional strobes (which can be housed for U/W photography) have sensors at the front of the strobe. Thus, as long as both the strobe and camera lens see the same view of the subject from the same distance, the sensor will accurately measure the amount of light reaching the camera lens. Underwater, however, strobe-mounted sensors have only limited value. Because U/W photographers often use angled lighting, the sensor sees a different view of the light reflecting from the subject than the camera. Also, in turbid water, the sensor can respond to light reflecting back from suspended particles immediately in front of the strobe. Therefore, except when the strobe is relatively close to the camera in clear water, strobe-mounted sensors aren't generally recommended for underwater photography.

Remote sensors solve the problems of strobe-mounted sensors. One can be mounted on or near the camera so it and the lens have virtually the same view of the subject. For greater accuracy, the mounting brackets of some remote sensors have a parallax adjustment so the lines of sight of sensor and lens intersect at the exact focused distance.

With TTL (through-the-lens), sometimes called OTF (off-the-film), exposure control, the sensor is inside the camera body and measures the strobe light that passes through the lens and reflects off the film during the exposure. Both MCD TTL strobes and the Nikon SB-102 Speedlight feature TTL automatic exposure control with the Nikonos V, and the MCD TTL can also be used for TTL exposure control with a housed Nikon FA or FE2. For increased reliability, the MCD TTL cord connection at the housing is non-detachable.

AUTOMATIC APERTURES

Automatic strobes usually give you a choice of one or more automatic apertures for which the lens is preset. The f numbers of these apertures vary with the film speed used and will be included in the automatic instructions. The higher the film speed, the smaller the apertures (higher the f number); the lower the film speed, the wider the apertures (lower the f number). The greater the number of automatic apertures you can choose from, the more versatile the exposure control.

With TTL systems, the lens can be set for any aperture. You can use close-up lenses, extension tubes and filters with exposure compensation because the strobe light is measured when it reaches the film.

AUTOMATIC RANGE

Automatic range is the minimum to the maximum camera-to-subject distances at which you can use the automatic control. If the camera and sensor are too close to the subject, most strobes can't be shut off in time to prevent overexposure. And, if too far from the subject, the strobe flashes at full power, but isn't strong enough to properly expose the film.

The automatic range is specified in the strobe instructions and varies with the automatic setting and ISO film speed used. Assuming a choice of automatic apertures, the widest one would have the farthest automatic range because less light is needed for an exposure. Conversely, the smallest aperture would have the smallest automatic range.

To quickly estimate the range for any given automatic setting, compare its f number to the manual exposure table supplied with the strobe. If, for example, the automatic setting is f8 for ISO 64, and the manual exposure table indicates that f8 is for a four foot distance, the range can't exceed four feet.

CONFIDENCE LIGHTS

A confidence light (auto check indicator) verifies that you haven't exceeded the range of the strobe. It works like this: You aim the camera and strobe at your subject and trigger a test flash. The flash of light from the strobe strikes the subject and bounces back to the sensor. If the sensor detects the proper amount of light for an exposure, the confidence light turns on.

If, however, the strobe flashed at full power and the sensor didn't detect enough light for the exposure, the confidence light doesn't turn on. This means that you have exceeded the automatic range and will underexpose if you try to take a picture. You must get closer, or choose a wider aperture (if you can).

Strobes with confidence lights usually have an open flash position on the power switch so you can trigger the flash without triggering the camera shutter. Otherwise you must waste a frame of film for your test.

A strobe with a TTL control may have a full flash indicator light that turns on if the strobe flashed at full power on automatic. If the light turns on, you are at the far edge or are beyond the automatic range for the aperture and film speed you are using.

THYRISTOR OR QUENCH TUBE

With the thyristor strobe, only the amount of electrical energy needed to power the flash is used. Because the unused energy stays in the strobe's storage capacitor to power the next flash, the drain on the battery is reduced. Thus, at close distances and with wide stops, recycle time can be incredibly short. The disadvantage is you might get underexposure and see a color shift in your slides at extremely short flash durations owing to reciprocity failure. That is, with extremely short (or long) exposure times, films do not react as predicted for the amount of light reaching the film.

Some automatic systems use a hidden quench tube. If only part of the available

SDM GUIDE TO AUTOMATIC STROBES				
Automatic Strobe	Manual Settings	ISO 64 Stops/ Auto Range	Sensor/ Connector	Confidence Light
Aqua F-1N Morris Photo Supply 6435 N. Proesel Ave. Lincoln Wd., IL 60645	Full, low sync, slave	f8 1.5-6'	Remote, removable/ E, I, N	Yes
Aqua F-3 Morris Photo Supply	Full	f2.8, 8 NA	Built into bracket, non-removable/ N	No
Helix Aqua-Flash 325 W. Huron St. Chicago, IL 60610	Full, low sync, slave	f8 1-6'	Remote, non-removable/ E, I, N	Yes
Ikelite Flash Monitor Ikelite 50 W 33rd St. Indianapolis, IN 46208	Full sync, slave	f4, 5.6, 8 1-6'	Remote, removable/ E, I, N	No
MCD TTL Marine Camera Dist. Studio B, 5121 Santa Fe San Diego, CA 92109	Full Adjustable beam angle 68 or 90 degrees	All stops 8"-8'	TTL dedicated to Nikonos V, Nikon FA and FE2/ NV, B	FA viewfinder display
Nikon SB-101 Nikon, Inc. 623 Stewart Ave Garden City, NY 11503	Full, 1/4 28 mm beam widener avail.	f8, 11 1.5-12'	Remote, removable/ N	No
Nikon SB-102 Nikon, Inc.	Full, 1/4 1/16, sync, slave W/A adaptor avail.	All stops Unspecified	TTL dedicated to Nikonos V/ NV	Full flash indicator
Oceanic 3002 & 3003 Oceanic 14275 Catalina St. San Leandro, CA 94577	High, low 3003 has sync, slave	f4, 5.6, 8 1-6'	Remote, non-removable/ E, N	No
Oceanic 2002 Oceanic	Full	f3.5, 5.6, 11 1-6'	Remote, non-removable/ E, N	No
YS 50A Sea & Sea 1334 S.E. 17th St. Ft. Lauderdale, FL 33316	Full 28 & 20 mm diffusers avail.	f4, 5.6, 8, 11 8"-11" 6"-5" with 28 mm diffuser	Remote, non-removable/ N, S	Yes

Abbreviations: W/A = wide angle, E = EO, I = Ikelite, N = Nikonos III/IV-A, NV = Nikonos V, B = non-detachable bulkhead, S = SeaLoc, NA = not available. Note: Past, present or future specifications may differ from this chart.

electrical energy is needed to power the flash in the flash tube, the excess energy is drained into a quench tube (a second flash tube, hidden from view) after power is shut off to the main tube. This decreases battery life because the battery must restore all of the lost energy to the storage capacitor even if only a small amount was actually used. Thus, recycle time remains the same.

There is an important exception: The MCD TTL utilizes a quench tube, but the

energy from the capacitor is divided to fire the two tubes simultaneously so flash duration isn't shortened. The less the amount of light needed for the exposure, the greater the ratio of energy sent to the quench tube.

DEDICATED AUTOMATICS

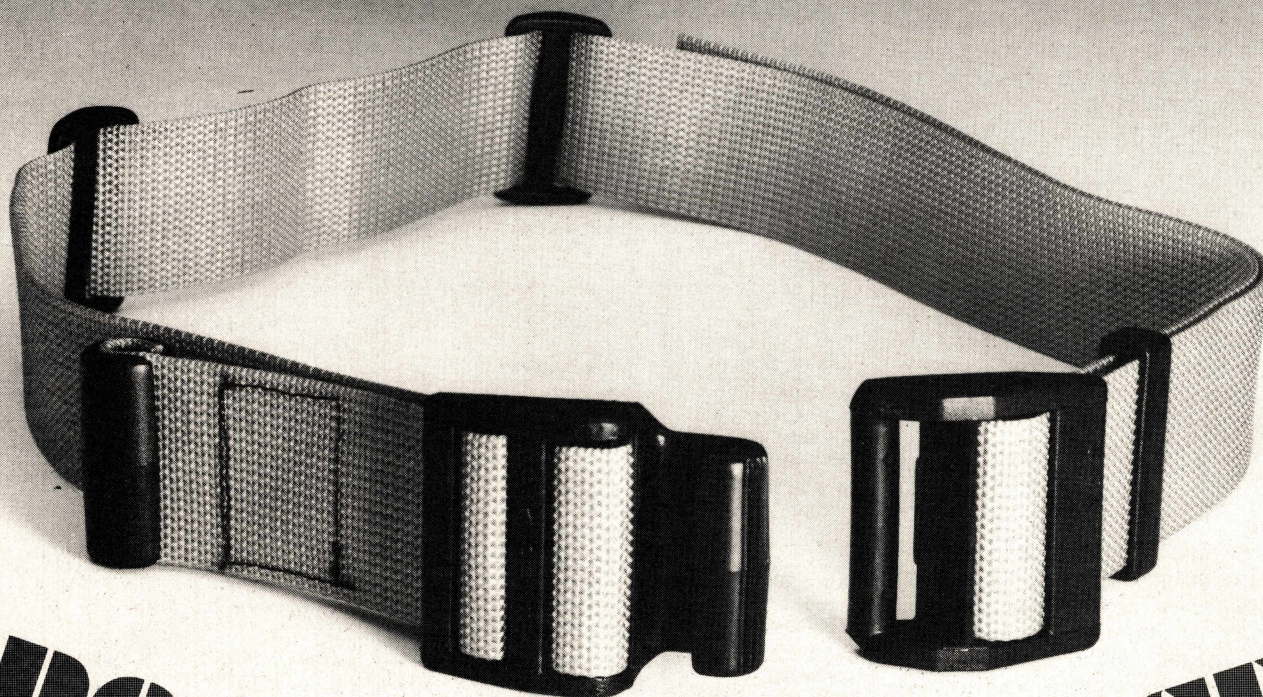
A dedicated strobe is designed to be used with only a certain camera or cameras. The camera and strobe communi-
(Continued on Page 118)

The sensor for the Oceanic 2002, 3002 and 3003 is midway along the sync cord. It attaches to a housing or bracket.



The Ikelite Flash Monitor can be mounted on a housing or camera. It adds automatic exposure to Ikelite Substrobes.





POSITIVE RELEASE SEAQUEST WEIGHTBELT

Instant release, one handed adjustment BY JIM WALKER

If you've ever tried to tighten your weightbelt during a dive to compensate for wetsuit compression and had it slip off once the buckle was opened the Sea-Quest Positive Release Weightbelt should interest you.

The weightbelt has a two part Delrin buckle which incorporates two ingenious design features: It allows the weightbelt to be tightened without opening the buckle and, more importantly, it allows the diver to open the buckle in one almost instantaneous motion if it becomes necessary to ditch the weightbelt. Just as important, the Positive Release buckle can't be mistaken for a tank strap buckle.

One half of the buckle is attached to each end of your belt. One half has a hook like tip and the other half a slot for the hook. Both halves slip on the two inch wide webbing in a somewhat conventional manner but the slotted half is the place where belt adjustment takes place. The

web strap slips through this half of the buckle, around a strut, and folds back against itself. The strut is able to shift its position slightly depending on which direction the strap is pulled. When the diver pulls on the extra strap outside the buckle, to tighten the belt, the strut moves back to allow the strap to slip through. (This is easier when the belt is wet, and is supposed to be even easier when the strap becomes somewhat worn. I found it a one handed operation except when the belt was exceptionally loose. Then one hand had to keep the weightbelt from turning around my waist; the other hand pulled on the strap.)

The hooked half of the buckle has two interesting features. First, the hook itself has a ridged surface which meshes somewhat with another ridge in the slot. This keeps the hook system from slipping open on its own. (I never had the buckle open on its own.)

The second and most important feature of the hook end of the system is what gives the Positive Release Weightbelt its name. The strap overlap at this end has a Velcro® patch which holds it flat against the rest of the belt and easy to find. The strap overlap ends in a Delrin grip that is easily found by touch. One tug outward on this grip opens the Velcro and simultaneously opens the buckle. The diver can direct the fall of the belt since he/she still has a grip on it. By turning the weightbelt over, the grip can be positioned to open with either hand.

For added convenience and comfort the belt comes with two Delrin guides which keep your weights from sliding out of position.

The Positive Release Weightbelt is available in black, orange, blue and yellow. It has a suggested retail price of \$19.50. Check out this unique belt at your SeaQuest dealer. 

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Technifacts

BY E.R. CROSS



This, and the next few Technifacts, will be providing information about the high technology aspects of research and commercial diving. It is hoped this will help sport divers make a more judicious decision with respect to attempting commercial diving without adequate training. In this context Technifacts will venture into the realms of factual diving that were underwater fantasies only half a century ago. It has been said that there is nothing new under the sun. A journey into diving history seems to indicate this.

Air breathing animals that dive must have air at a pressure equal to the depth of the dive if they are to survive without injury. In breath hold diving, air pressure within the body spaces is equalized mostly by compression of the lungs until air in them and the balance of the respiratory system and other air spaces is equal to ambient water pressure. However, a

one atmosphere bell is strong enough to withstand the pressure at the depth of the dive. Breathing gases within the bell are usually contained in high pressure cylinders and a carbon dioxide scrubbing system absorbs exhaled CO₂ to maintain a life supporting breathing gas or mixture at a pressure of one atmosphere.

In other types of diving, divers must have a respirable mixture, generally air in most commercial and almost all sport diving activities. In commercial diving beyond a depth of 200 feet or so a mixed gas, usually helium and oxygen, but sometimes with a low percentage of nitrogen added, is used as a breathing gas.

There is a multitude of ways the breathing gas is maintained or delivered to research, commercial or military divers. These systems will be discussed in future Technifacts. In sport diving, air is delivered to a diver via a high pressure cylinder

outfitted with a pressure reducing device and a demand regulator.

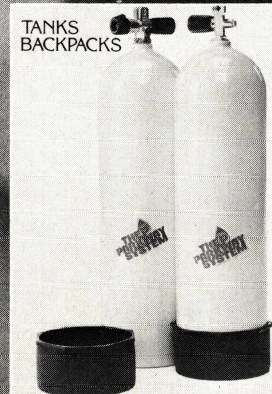
It is the simplicity of the equipment and its versatility and adaptiveness that have led many sport divers to the fringes of commercial diving.

Other sport divers become involved with some aspect of commercial diving owing to their own work specialty. Many construction workers, routinely using tools, equipment and techniques frequently adapted to underwater use, see the opportunity for higher earnings by learning to work while diving.

Another reason sport divers go commercial is managerial persons, engineers and specialty technicians see ways to become totally involved with underwater projects that once were only paper jobs.

There is, of course, serious potential for problems in these quasi-commercial divers. First, is the lack of adequate ex-

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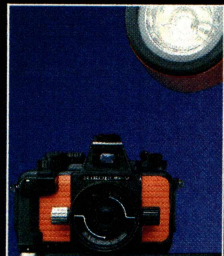
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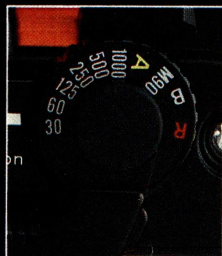
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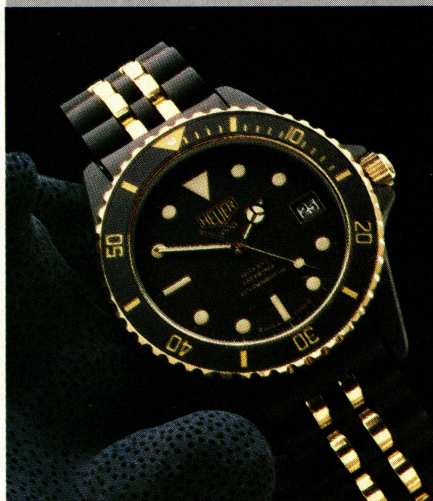


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perience in the frequently unknown and often rapidly changing conditions usually present on commercial diving jobs. Currents, low visibility, heavy equipment, the size and complexity of things being worked on or with, high pressure gases, electrical, pneumatic and hydraulic tools and the sometimes large number of persons involved, make many diving jobs hectic and, to all except a really experienced diver, totally confusing.

The sport diver who tries to adopt commercial diving almost always lacks the experience in, and sometimes the knowledge of, how to bridge the gap between the drawing board and the underwater project. Experienced divers feel this gap should not be filled in many cases. Underwater construction is not an engineeringly fine project. Tolerances in work that would not be acceptable above water are routine underwater simply because closer tolerances are not possible. Granted, there are jobs that do require these and, given adequate time, money and equipment, well trained and experienced divers can achieve those tolerances.

Possibly the most serious obstacle a sport-gone-commercial diver must overcome is a lack of experience that causes poor judgement or improper decisions. If a sport diver working part time as a commercial diver develops a reputation for failures or poor craftsmanship, his/her work reputation may follow and reduce the chances of success, even after completion of a commercial diving course. To avoid the many potential problems that exist in a transition from sport to commercial diving it is strongly recommended that the aspiring commercial diver attend a commercial diving school. Not all of these are the same. Potential students should carefully study brochures and programs to find a school that will provide training in the field in which the student wants to work.

DIVER ASSISTANCE DEVICES

In recent years a large number of devices have been developed to help solve underwater work problems. Some of these were designed as diver assist equipment, others as diver replacement systems. Diver propulsion vehicles (DPVs) were discussed briefly in May 1984. Basically, these small units are designed to assist a diver through the water. Similar units have been developed in commercial diving. The numbers, designs and purposes for which they were built have proliferated so much there is a design for almost every purpose.

A step above, or perhaps below, the diver propulsion unit is the wet, manned vehicles. These are basically propulsion vehicles in which the diver rides and is propelled through the water. Dry,

manned submeribles are used mostly for underwater observation and inspection. Beyond these are the manned, dry submeribles with diver lock-out capabilities.

Tethered one man, one atmosphere articulated diving bells or suits permit slightly more mobility. In this category the first in modern times was JIM; then WASP, SPIDER and others. Tethered unmanned submersible units were developed later. These, too, were originally used for underwater observation. Soon controls and umbilicals were developed that gave them mobility. Underwater video systems, cameras of all types and tools attached to or held by various kinds of manipulators soon made these units devices that could compete with commercial divers for some underwater jobs. There is now a trend toward utilizing the best of the remote controlled vehicle (RCV) capabilities in a diver assist or diver observation mode. Obviously some jobs are simply beyond the capabilities of a diver and only an ROV or a manned bell can be used. One example of this is the Shell Oil Company's well drilled off the East Coast in 7,500 feet of water. RCVs provided complete underwater support. Today, all modern RCVs are fitted with underwater TV systems that become the eyes of the topside operators. Since they are unmanned there are no depth or time limits to their stay U/W.

At least one RCV unit has been fitted with a microcomputer-control system to assist topside personnel under poor operating conditions. Even more advanced computer software is expected.

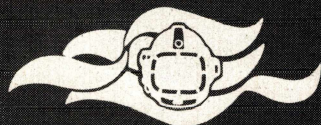
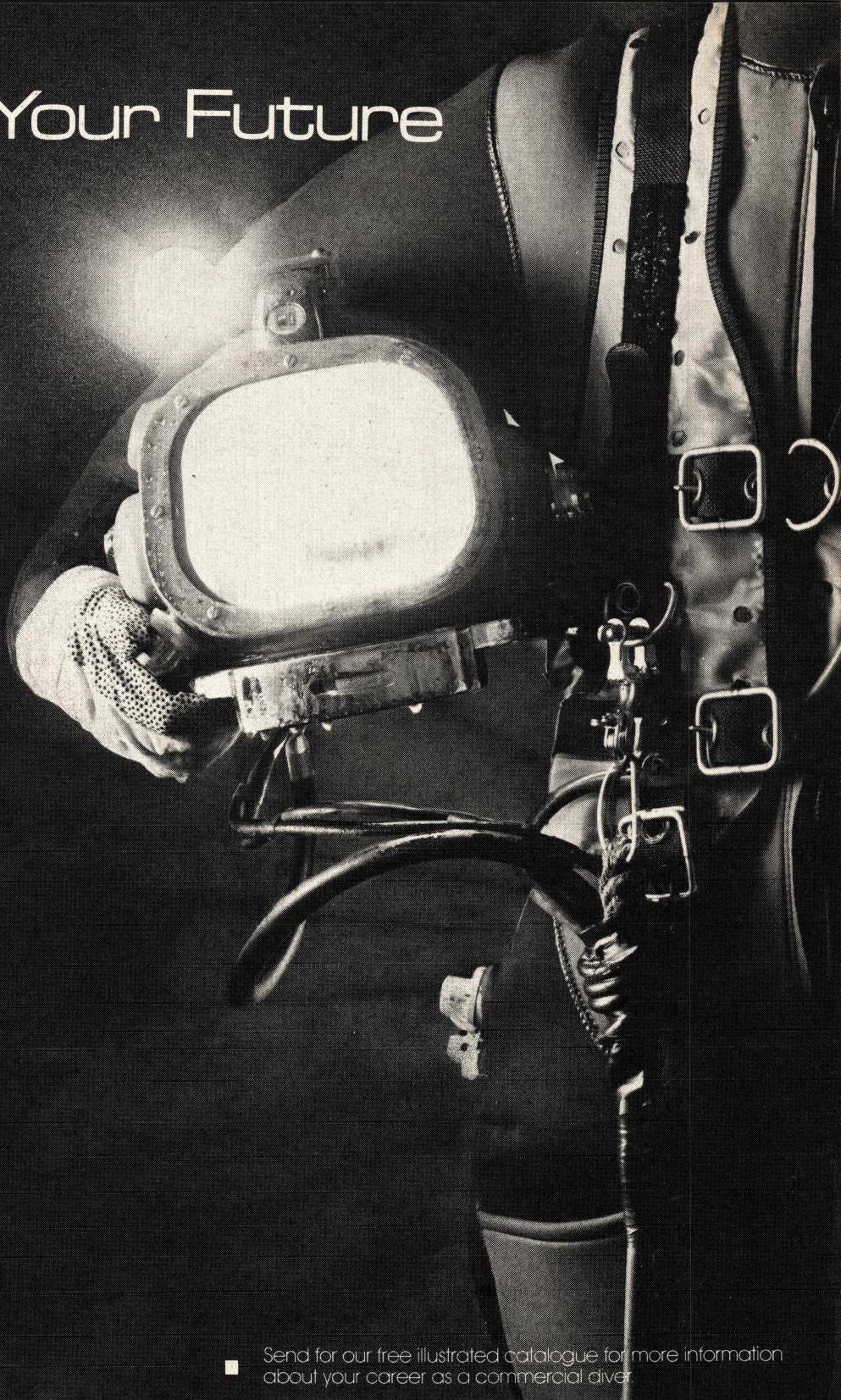
Some RCVs are special purpose rigs but most perform many functions. Benthos Undersea Systems Technology in Massachusetts sells the Benthos RPV-430 (RPV being Remotely Piloted Vehicle). This has black and white and color TV systems; 35 mm still cameras; multiple lighting systems; a relocation pinger in case the unit gets lost; a strobe light for night surface location; a three function manipulator arm with an accessory package having a grab, a cutting device, and with rotating functions; and a cathodic protection measuring probe. Included in the standard package are the surface control console, launch cage, tether management system and surface handling assembly with winch and A-frame.

At the moment the two largest manufacturers of diverse lines of ROVs are COMEX in France and Perry Oceanographics in Florida, both of whom manufacture a variety of manned and unmanned systems.

Technifacts will continue delving into the world of sophisticated high technology diving in future issues of SKIN DIVER Magazine. Some of the developments in diver assist devices, science fiction only a few years ago, are now making the life of commercial divers easier and safer as they go deeper. Be with us as we pass the 1,800 foot dive mark. >

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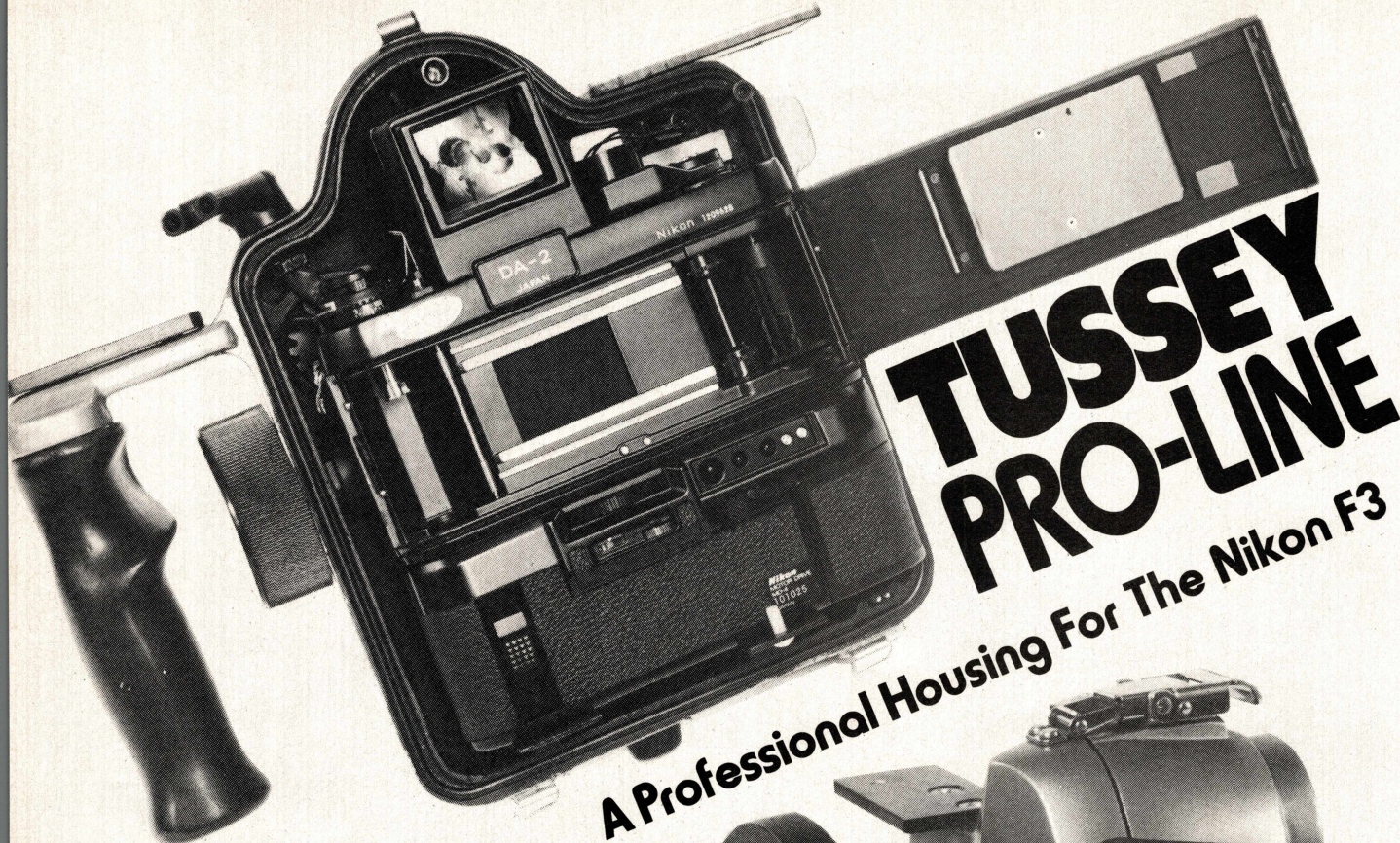
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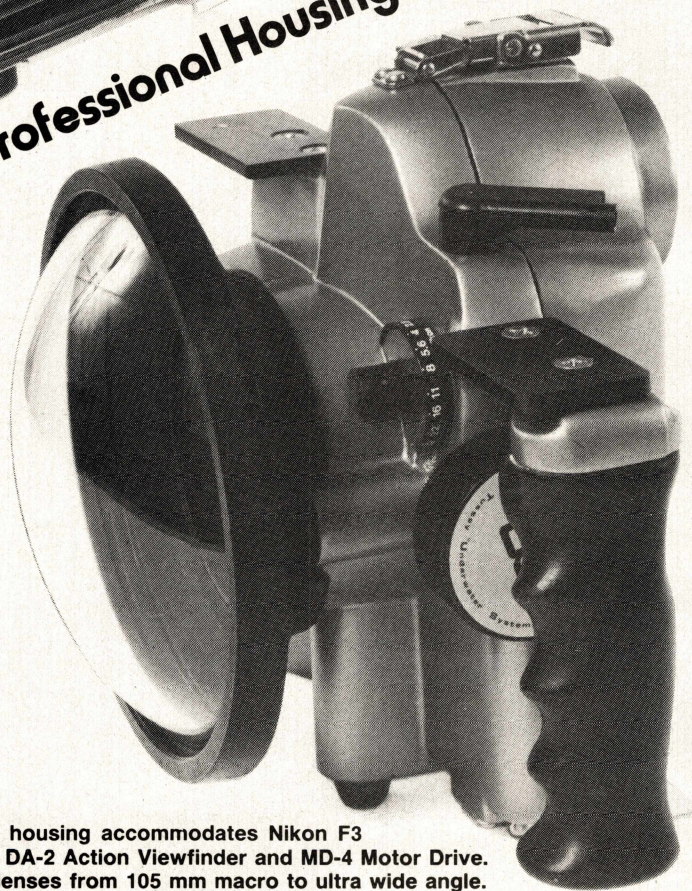
TEXT AND PHOTOGRAPHY BY GERI MURPHY

Have you ever dreamed of owning the ultimate underwater camera system? I bet I can guess what it would be. It would start with an SLR camera with a giant viewfinder. Of course, there would be motor drive for fast action and sequential shooting. Naturally, it would offer interchangeable lenses, ranging from ultra wide angle to 105 mm macro. And, to make it all practical, the rig would be compact enough to fit into a shoulder bag or carrying case that would fit under an airline seat.

A dream you say? Not any more. Tussey Underwater Systems of Tujunga, California has made this concept an exciting reality. The ultimate has finally arrived.

Chet Tussey, designer and owner of Tussey U/W Systems, has succeeded in building the dream underwater camera system. Tussey is a veteran underwater photographer who has devoted years of research and development to the field of housing design. He first gained national attention two years ago with the introduction of the T-300 super compact housing for such 35 mm SLR cameras as the Nikon FE, Nikon FM and others. His latest contribution represents the next genera-

The Pro-line housing accommodates Nikon F3 camera with DA-2 Action Viewfinder and MD-4 Motor Drive. Its ports fit lenses from 105 mm macro to ultra wide angle.



tion of Tussey housing design and a dazzling display of creative engineering.

DESIGN

The Pro-line is Tussey's vision of the ultimate in state-of-the-art housing technology for the best 35 mm camera available today. It has been designed specifically for the Nikon F3, fitted with a DA-2 Action Viewfinder and an MD-4 Motor Drive. This particular system is the top of the Ni-

kon line and is regarded as the most professional 35 mm still camera system in the world today. Its wide range of professional capabilities puts it light years ahead of the Nikonos.

Tussey starts with an ultra-compact housing which is literally molded around the F3 motor drive camera. It is by far the most compact motor drive housing in existence today. It measures 9½ inches high by 10 inches wide by 8 inches thick

(including dome port). It is small enough to fit into a standard camera shoulder bag or Pelican camera case.

The Pro-line is an all metal housing that splits into two parts with the camera mounted in the front half. Changing film is easy since the camera does not have to be removed. The user simply unsnaps the rear door of the housing and opens the back of the camera.

The Pro-line is fitted with four external controls that operate the entire camera system underwater. A large two and one-half inch diameter focusing knob is conveniently positioned under the left hand pistol grip. Close by is a quadrant-style aperture control lever for quickly setting lens f stops. The shutter speed selector knob is on top of the housing and provides a full range of speed controls from eight seconds to 1/2000 second, plus auto exposure. The shutter release is operated by a push button. In addition to firing the camera this button can be rotated to switch on interior lights for reading aperture settings and the frame counter.

A two inch diameter window at the rear of the housing provides full screen through-the-lens viewing. This is large enough to be used with any type of face-mask. In addition to full screen viewing, the Pro-line's interior lighting system allows the user to clearly see the f stop in the viewfinder, as well as the aperture recommended by the F3's computer.

A smaller viewport to the right of the main one allows the user to check the camera's frame counter. This is fitted with a magnifier which gives a clear and enlarged view of the frame counter and indicates precisely how many pictures have been shot.

The Pro-line housing allows full utilization of all Nikon F3 capabilities while shooting underwater. Yet, the housing controls are simple enough to be operated quickly and effectively when a photo opportunity arises suddenly. The controls are well placed.

CONSTRUCTION

Tussey has built the Pro-line housing with the same craftsmanship and quality found in the Nikon F3—nothing but the best, no cutting corners here.

The housing itself is cast aluminum, high grade alloy. It is thick enough and contoured sufficiently to withstand operating depths of an estimated 500 feet or better. However, Tussey is a cautious man and he has given the housing a wide margin of safety. Each Pro-line is individually tested to 325 feet and guaranteed leak-free.

All external housing controls have high grade, one-quarter inch diameter, polished

stainless steel shafts with quad O-ring seals. The outside control knobs and levers are either anodized aluminum or plastic (depending on type of control). They are held in place by stainless steel set screws.

The internal housing gears are black anodized aluminum. They mate up with rubber ring gears on the lens. The shutter release button is a high quality switch of Tussey's own design. The external flash connection is a bulkhead fitting and can be custom ordered for use with either SeaLoc or EO.

The seal between the housing halves is a large O-ring gasket which fits into a contoured groove and is backed up by a locating flange. The halves of the housing are held together by three heavy duty, spring loaded, stainless steel snaps.

The front lens ports contain a dynamic bore-type O-ring seal which slides onto a cylindrical housing flange. The ports are held solidly in place by two stainless steel set screws. The ports themselves are made of optical quality acrylic held tightly in place by a stuffer-type O-ring gasket. They are quickly and easily removable.

The entire housing is anodized black and then finished outside with a diamond hard, metallic, silver-bronze, baked on enamel. The interior of the housing is sealed and finished with a flat black baked enamel.

SPECIAL FEATURES

Tussey's Pro-line housing contains a number of unusual features which are seldom found in today's 35 mm SLR housings. The most impressive is probably the interior lighting system. It consists of miniature light bulbs that illuminate normally hard to read numbers on the f stop scale of the lens, the automatic exposure sensor and the film frame counter. A simple twist of the shutter release button lights up these numbers instantly. This unique system is an absolute joy when diving at night, in wrecks or caves or in dim light.

A simple but extremely effective feature of the housing is the nylon camera alignment screw. The camera is anchored onto the housing baseplate by a 1/4-20 stainless steel screw on the left side of the motor drive. This off-center anchor system tends to make the camera pivot. Tussey has devised a clever method for ensuring true and accurate alignment of the camera body and lens: A nylon screw on the right side of the housing presses up against the slanted motor drive base and establishes a rigid camera mounting.

Another impressive feature of the housing is a built-in water detection system which warns the user of even the slightest

leak. The detector circuit is powered by a nine volt battery and has a two prong sterling silver moisture sensor at the very bottom of the housing, one-half inch below the camera/motor drive baseplate. A single drop of water on these contacts will set off an audio alarm which can be clearly heard by the camera operator. In addition, the water detector alarm switches on a bright red LED light positioned in the viewfinder. The operator is unlikely to miss this double alarm.

One of the most attractive features of the housing is the wide range of ports available for different Nikon lenses. Tussey has taken a very professional approach toward lens port design by avoiding the typical "one port fits all" approach. He has designed five different ports to fit several different lenses.

The long barreled port is designed specifically to operate with the new Nikon 105 mm tele-macro lens. This is a highly specialized lens which is marvelous for full frame photos of hard to approach creatures such as jawfish and garden eels. The short barreled port is designed to fit the Nikon 55 mm macro lens which is great for super close-ups.

The medium wide angle port is designed to operate with a variety of lenses including the Nikon 24, 28 and 35 mm. The ultra wide angle port is larger and optically corrected for the Nikon 20 mm lens. For the photographer who wants extreme wide angle shots, Tussey has designed a 180 degree dome port that will specifically accommodate the 15 and 18 mm lenses. The housing offers a lens port for just about every occasion.

CONCLUSION

SDM's testing and evaluation of the Pro-line indicates it to be a truly professional 35 mm camera housing. It offers the underwater photographer a whole new dimension in housing control. In fact, one might say the Pro-line is a forerunner of perhaps a whole new generation of housing designs.

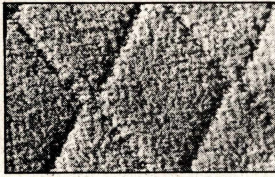
Above water portability, underwater controllability and compact size make this housing an easy choice for the Nikon F3 user. At a price of \$1,275 (housing equipped for a 55 mm Micro Nikkor lens) it may not be for everyone, but considering the price of the F3 with motor drive, it is a bargain. For a slight additional charge the housing can be modified to fit any Nikon F series camera.

For more information and prices, contact your local pro dive store or write to: Tussey Underwater Systems, 7118 Foot-hill Blvd. Tujunga, CA 91042. If you can't wait to get your hands on this new goodie, you can call (818) 249-2700. 

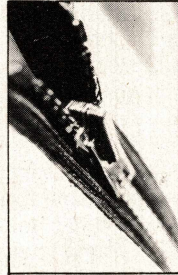
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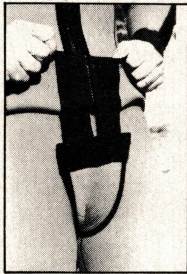
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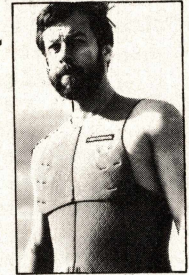
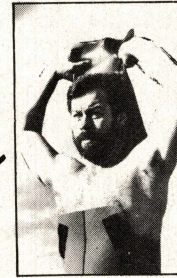
Super stretch deep pile diamond nylon for easy entry, resistance to abrasion and ultraviolet damage.



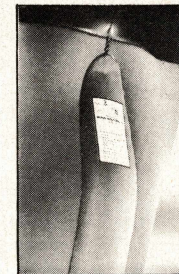
Delrin zip with corrosion free **NICKLE SILVER** slider



Triple Velcro® fastener



Long John top smoothskin continuous neck seal, Velcro® fastened



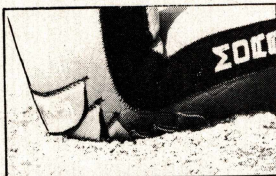
Shaped and contoured spine pad in Long John



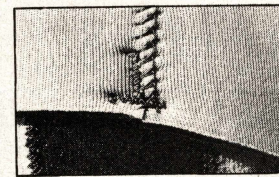
Double sealed fly zip optional extra



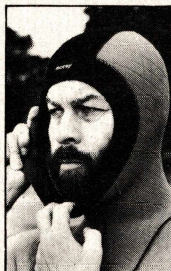
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Toshiba K-133

Rugged, Powerful—
and Inexpensive

**TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE**

If you like big, bright, wide angle underwater handlights, the Toshiba K-133 was made for you. Nearly 14 inches long, it weighs 2 pounds, 12 ounces with its four D-cell batteries installed. The tungsten halogen lamp, along with the shiny reflector, produce a bright, wide beam that illuminates a path up to seven feet long. And, with fresh alkalines, the Toshiba light has a burn time of more than five hours. Rechargeable ni-cad batteries can also be used and they provide two to three hours of light.

The K-133 has an extremely rugged,



impact resistant ABS resin housing. On the outside are six raised rings, each one and three-sixteenths inches (3 cm) apart. These make the light easy to grip, even with gloved hands, and serve as a handy measuring device for objects up to eight inches (21 cm) long.

Although the K-133 is heavy out of the water, it handles well and is nicely balanced underwater. There is a removable five ounce lead weight on the inside that makes it slightly negative. You can put it down and it will stay in place underwater with the on/off switch facing up. Without the weight it will float, beam up. The light is pressure proof to 165 feet, according to the manufacturer. Although we didn't test it that deep, we are inclined to believe this claim—the light looks rugged.

One of several nice features of the K-133 is its well marked on/off switch. This slides smoothly and ends guesswork as to whether the light is on or off. Also, there is a special slit under the switch that



allows you to flush the area with fresh water, eliminating problems caused by the buildup of salt crystals. Inside the K-133, to one side of the lead weight, is a spare lamp, secured with its own bracket. An adjustable neoprene wrist strap on the outside makes carrying the light when it is not in use easy.

Changing batteries is simple. Unscrew the lens cap and dump the cells out. Replace all of the batteries at the same time for optimum performance. Inside the battery holder is a diagram that shows you their correct positioning (it's easy, the



positive poles face up). Before putting the lens cap back on, clean and lubricate the O-ring, at the base of the threads, with silicone grease. (Since this O-ring can only be taken out with a special tool, you do not need to remove it.) Extra O-rings are available from the distributor.

The K-133 needs no special care: Just rinse in fresh water and let dry after use. Remove the batteries if you aren't going to be using the light for awhile.

The Toshiba K-133 isn't limited to underwater use, it's great topside, too—boating, camping, fishing; whenever you need a bright light that's water resistant and sturdy. It isn't expensive, either—it sells for \$34.95. Also available is the yellow K-132A. Slightly less bright because it uses a krypton bulb and, yellow in color, it sells for \$27.95. For information on either light contact the distributor: Morris Photo Supply, Inc., 6435 Proesel Avenue, Lincolnwood, Illinois 60645.

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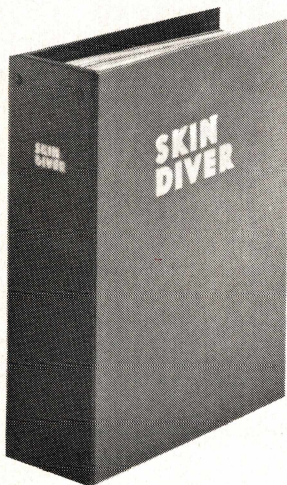
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BY BONNIE J. CARDONE

Ok, I admit it, I've always wanted to pose underwater for a famous underwater photographer. Attired in my typical tropical garb of jeans and rust-marked turtleneck, however, I knew I wasn't terribly photogenic. The arrival of Henderson's Red Coral wetsuit changed all that. Shiny black Lycra with hot pink/purple striped insets, it is a beauty.

The suit slipped on easily—the inside is a plush terrycloth—and fit me like a glove. The jacket is a step-in shorty with long sleeves. Triangular pink/purple insets on the front and back make it look good coming or going. There are also insets at the cuffs and matching stripes down the outside of the pants.

The Red Coral is also comfortable. The top has no beavertail and could be worn by itself. Both it and the farmer janes have full length YKK zippers with Delrin teeth and marine grade bronze pulls. The suit has that attention to detail that makes a good suit great: All the edges are bound with stretchy seam tape; gussets under the arms and at the crotch allow a good fit and freedom of movement.

Now that I looked good I needed two things: A trip to tropical waters (that's where famous U/W photographers seem to hang out) and a famous underwater photographer willing to take a chance on an untried model. A streak of luck provided both.

First, someone dropped out and I dropped onto a trip to the Philippines at the last minute. (I packed the Henderson first!) Then, partway through the trip, the female half of the well known photographic duo who were our tour leaders became ill. As the male half of the famous pair toyed wistfully with his wide angle camera setup, I appeared in the Red Coral, nonchalantly suggesting I fill in for his ailing partner. He eagerly agreed. I knew the suit had made a good impression.

The photo session seemed to be going well until the photographer wanted me to touch a crinoid that was surrounded by fire coral. Without my gloves there was no way I would even think of such a thing. I retrieved my camera and started taking pictures of the photographer. Behind the camera, the one-eighth inch Henderson kept me warm in the 80°F water even after more than an hour. The terrycloth interior minimizes water exchange which contributes to the warmth of the suit. The suit also protected my arms and legs from the fire and stony corals.

Afterward, back on the boat, I could see the anxiety in the eyes of the female half of the famous photographic duo: Would the old partnership be ending and a new one forming? Not exactly. Suddenly he was very solicitous of her health and she decided she was well enough to dive once more. He never asked me to pose again. When I saw the photographs I



photo/Bonnie J. Cardone

The Red Coral looks good both topside (model: Pam Cardone) or U/W (model: Bonnie Cardone). There are hot pink/purple insets on the front, back; accent stripes on the pants.



photo/Jim Church

knew why. It wasn't the suit, it looked great. It's just that the model . . . well, let's just say that I'd better stick to writing, the doors to an underwater modeling career are not wide open to me right now!

The Red Coral is custom made in one-eighth, three-sixteenths or one-quarter inch neoprene. Although the insets are only available in hot pink/purple, the basic suit can be silver, navy, royal blue, lavender, black or any Henderson color.

Color coordinated hoods are available.

Of course, the price of beauty, comfort, warmth and protection does not come cheap—the Red Coral sells for \$680. This includes the customizing and any three options, i.e.: knee pads, arm or leg zippers, spine pad, etc. For more information contact: Henderson Aquatics, Inc., One Whitall Avenue, Millville, NJ 08332. My modeling career may be over, but yours could be just beginning. 

AERO 350A

SDM SPECIAL SERIES ON REGULATORS

DACOR AERO 350A



TEXT AND PHOTOGRAPHY BY GEORGE COZENS

Dacor Corporation of Northfield, Illinois, has gained an enviable reputation over the last several years for its Pacer (Positive Air Controlled Equalizing Regulator) and Pacer XL series of scuba regulators. During this same period Dacor engineers also worked on developing a new mid-line series of regulators. Just recently introduced, this series is the result of many years of varied regulator experience, three years of intensive design and development, and a year of extensive testing and evaluation, under a wide range of environmental conditions around the world. Aero is the name given to this new line, which consists of three models: the Aero 950A, 650A and 350A. The latter is the subject of this article.

The first stage of the Aero 350A is closely related to the first stage of the Pacer 350XL and to the 300 before it. The basic design is that of a balanced diaphragm—balanced to compensate for changes in cylinder pressure, so that the intermediate pressure of about 140 psi is held nearly constant no matter what the

tank pressure. With constant intermediate pressure, the second stage can be more finely tuned for better performance which should not change significantly during the dive. Other benefits of this design are reduced weight and size. Although the first stage body and yoke are forged brass protected with a triple chrome plating (first copper, then nickel and finally chrome), they weigh a mere 19 ounces and measure only about one and one-half inches in diameter and five and one-quarter inches in length (of which two and three-quarters inches is owing to the yoke and knob). The diminutive size of the first stage is not an indication of its performance: The Aero 350A first stage can deliver a respectable 28 standard cubic feet of air per minute, measured at one atmosphere and with a supply pressure of 3,000 psi. This is about the same capacity as the larger Aeros.

The yoke of the 350A has a pressure rating of 3,000 psi, and swivels a full 360 degrees, for more convenient hose placement when attaching the first stage

to the cylinder valve. And, the large plastic yoke knob is deeply grooved for a better grip even when wearing gloves. Unlike the other models in the Aero series, the 350A first stage is not adaptable to the European DIN tank connection—this, however, is not much of a restriction in most diving situations. Materials used in other major components of the first stage include: a nylon reinforced neoprene high pressure diaphragm; an injection molded neoprene high pressure valve seat; and a stainless steel first stage spring.

The Aero 350A first stage offers one high pressure port, identified HP, and three low pressure ports. Because the entire body can rotate on the swivel yoke, a separate low pressure swivel block is not necessary for hose positioning. Should additional low pressure ports be required for some special application, a multiple hose adapter, such as Dacor's Model OA or OAR swivel, could be attached easily. Environmental protection is not a standard feature in the Aero 350A first stage, but there is an optional kit

available which retails for about \$20.

The major differences between the Aero 350A and its Pacer counterpart are in the second stages. While both utilize a downstream demand valve design, the emphasis in the development of the Aero second stage was placed on low maintenance, simplicity of design and economy. In brief, the Aero second stage is more conventional in design with no frills. The case front and the purge button are molded of Noryl®, a modern plastic known for its overall durability and resistance to abrasion. The case back is glass-filled Valox®, a new plastic selected for its strength and durability. Both plastics, incidentally, have shown very good thermal characteristics in the temperature range from zero to 230°F and resistance to long

back. Also of chrome plated brass is the demand valve body and this is mounted in the side wall of the back cover. A small tube extending from the end of the demand valve helps to direct some of the air toward the mouthpiece, thereby increasing the venturi effect and reducing the inhalation resistance as the demand for air increases. The last link in the supply side of the second stage is the stainless steel demand lever which opens and closes the demand valve according to movements in the silicone rubber diaphragm. On the exhaust side of the second stage, the back cover has a very large opening, completely covered by a chromed brass plate. This plate, called the "exhaust valve retainer" by Dacor, is secured to the bottom box by a stainless steel screw

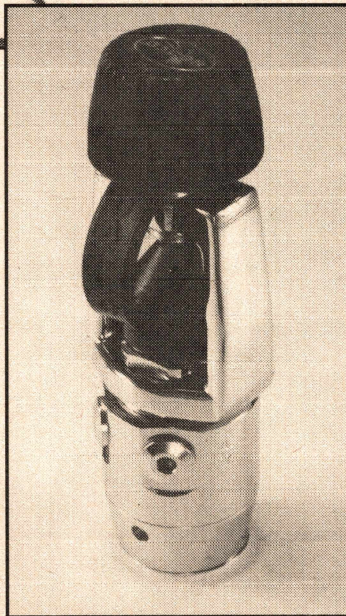
from the field of view. Neoprene is used in the standard mouthpiece, but natural gum and silicone rubber mouthpieces are also available.

With the corrosion resistant materials and the conventional, time-proven design, the Aero 350A should certainly be a low maintenance regulator. Nothing about it suggests any special maintenance is required. As the manufacturer recommends, only routine care is necessary; rinsing after use and storing out of direct sunlight, in a cool, dry place. Of course, professional service is recommended annually: To keep the ten year limited warranty in force it is required. Such service might run about \$15 to 20 for the typical replacement parts in a complete overhaul and approximately the same amount for labor. During my evaluation dives with the Aero 350A, the regulator performed quite well. Inhalation and exhalation resistances were close to those of the comparison regulator which was attached to the same tank by means of Sherwood's Slingshot valve. Comparisons were made at depths ranging from about 20 feet down to 100 feet, from minimum to maximum inspirations and expirations, and with the supply pressure varying from 2,000 psi, to about 100 psi. At the 100 foot depth, when the tank pressure was about 1,500 psi, I tried to out-breathe the Aero 350A, but didn't have any luck: It supplied all the air I could handle. The inhalation resistance was just slightly higher than that of the comparison regulator and not much more than its own inhalation resistance at normal breathing volumes at this same depth. No idiosyncrasies were noticed during the dives, nor was any water leakage detected in any of the various positions tried. Freeflowing was also a non-problem: Under the worst-case conditions—with the mouthpiece pointed vertically upward and the second stage full of air or after depressing the purge button—the 350A freeflowed only a few seconds.

Considering the sound, conventional design, solid, corrosion resistant materials, very good performance, low maintenance and economical price (\$165 suggested retail), the Dacor Aero 350A should be a good regulator for general use and very well suited for instructional and/or rental programs. The second stage can also be purchased by itself, with a yellow cover and hose protector: The suggested retail price of \$80 includes a hose of standard 26 inch length; for \$5 more a 39 inch hose is included. For reasons already mentioned, in addition to the bright color coding and absence of freeflowing, the Aero second stage would do very well in octopus applications. For more information contact: Dacor Corp., 161 Northfield Rd., Northfield, IL 60093.



Below, left: Aero 350A second stage. Right: First stage has one high, three low pressure ports. Above: Second stage parts including exhaust valve retainer with dual ports; two front covers.



term exposures in acid and sunlight. The front, which contains the spring-loaded purge button, is offered in standard black, an optional blue or in yellow.

Like the Model T Ford, the case back comes in any color you might want—as long as it's black! A chrome plated brass clamping ring secures the front to the

and sealed against leakage with its own soft rubber gasket. Most of the plate's central area has been cut away to form two, one inch diameter ports, each of which is, in turn, covered by a silicone rubber exhaust valve. The neoprene exhaust tee snaps directly onto the back cover and helps guide bubbles away



photo/Jim Walker

GO FOR THE GOLD

With Keene's 2002 Portable Dredge

BY JIM WALKER

Jerry Keene of Keene Engineering in Northridge, California is a pioneer in treasure hunting and portable gold dredging systems. With a half century of experience in this field, his designs and innovations have paved the way for professionals and hobbyists alike. When Keene speaks, people listen.

One of the most important points he makes is that there are thousands of small, gold bearing streams in the Mother Lode country of California which have never been touched by a gold dredge. (I would add that the same would be true of many other areas in the U.S.) The potential dredger has to locate these promising areas and to do so he/she needs a portable dredge to get off the beaten track. Once on site, the dredge must process gravel quickly and efficiently.

The 2002 portable dredge has a two

inch diameter suction hose. Combined with a peppy 1.2 hp Kawasaki two stroke engine this is perfect for those small streams and creeks where all that gold is hiding. The engine offers six hours of dredging on a gallon of fuel while processing up to two cubic yards of gravel per hour. Although not as compact as its predecessor (model 2001), the 2002 is still backpackable. (A pack frame would be an optional accessory.) Fully assembled, it weighs only 46 pounds.

The 2002 comes with a power jet configuration for increased suction power, but an optional suction nozzle is available for use in very shallow water. The eight foot long suction hose allows the user to cover a large area without moving the dredge or to work in deeper water.

The dredge's engine bolts onto a frame made of metal tubing and this is bolted to

two Marlex pontoons which support the dredge on the water or on land.

The sluice box or riffle box is the heart of any dredging system. The water and gravel pumped up the suction hose pass over the riffles and heavier substances such as gold are trapped there.

The sluice box of the 2002 incorporates the latest in efficient design. First, Keene has provided a large area for your gold to be trapped in. The box measures 10½ inches by 35 inches. The classifying screen runs almost half this length and keeps large rocks from piling up at the top of the riffles and sorts out the smaller, heavier particles early. The riffles are angled precisely to allow lighter gravel to pass over while holding gold. The riffles are "self-cleaning" which allows the user to operate the dredge for hours before the box needs to be emptied. Below the

riffles is a ridged carpet designed to trap the tiniest particles of gold. The riffle system is hinged at the back allowing it to be lifted up to remove the carpet. It locks in place with two snap-over clasps at the mouth of the box. An important point to note, according to Keene, is that the engine is not placed over the riffle box. In designs where this is not the case fuel can drip onto the carpeting and actually repel tiny gold particles.

Once you've found a likely place to dredge, setting up the 2002 is easy. The only tools necessary are a large flat blade screwdriver, an adjustable jawed wrench or socket set and a pair of pliers. Simply bolt on the engine and attach the hoses with the clamps provided. Fuel mixing (which ideally can be done before your excursion) is made easy by the graduated mixing vessel provided.

The riffle box has a choice of three settings which adjust the slant of the box and thus the speed at which the water will

pass through it. This water speed is also a result of how fast the engine is run. Ideally, the water and its accompanying gravel should pass through, leaving only the heaviest materials in the riffles.

You must pick the most likely locations for gold to accumulate in a stream, such as where the water slows or deepens suddenly after a swift run. This can be on the inside of a bend or behind an obstruction, etc. Of course, experience is invaluable when it comes to site selection but Keene has all the background material you could need on the subject. Also, stores that sell gold dredging equipment often offer prospecting classes.

Your dredge site should have underlying bedrock that isn't buried too deeply. Sample a likely location, attempting to get to the bedrock and the heavier materials near it. If your technique is good, one full riffle tray should tell you whether there is gold present. If not, move to a more likely location. One advantage of a small

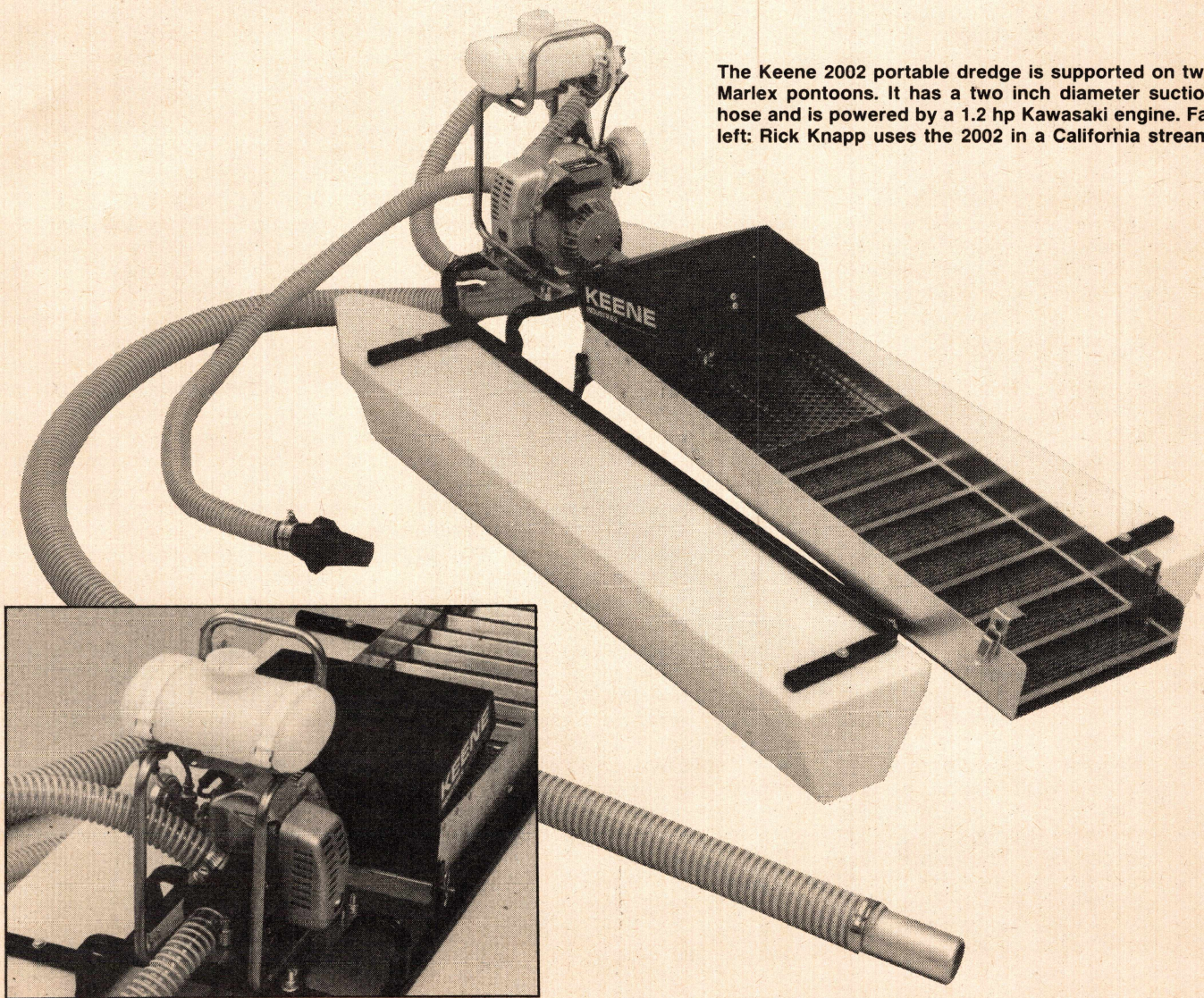
dredge is its portability.

Your dredging shouldn't be too vigorous. Trying to suck up too much gravel at one time can clog the hose. If this happens, shut down the engine. Next, try to shake out the hose, working from the suction end up. Keene provides a 48 inch long rod which can be inserted through a slot in the riffle hood and poked down the suction hose from the top. If all else fails you can uncouple the hose to clean it.

Once you have a full riffle tray the contents should be carefully removed by lifting the hinged riffles and rolling up the carpet. The carpet should be carefully rinsed into a large bucket and the remaining contents of the riffle box rinsed into the bucket as well. The gold can be panned out of the bucket at your leisure.

The Keene 2002 portable gold dredge sells for \$479. For more information or for any of your treasure hunting needs contact: Keene Engineering, 9330 Corbin Ave., Northridge, California 91324. 

The Keene 2002 portable dredge is supported on two Marlex pontoons. It has a two inch diameter suction hose and is powered by a 1.2 hp Kawasaki engine. Far left: Rick Knapp uses the 2002 in a California stream.



PARKWAY'S OCEAN JACKET

*Strikingly
Stylish,
Cleverly
Designed*



TEXT AND PHOTOGRAPHY BY MARTY SNYDERMAN

The evolution of buoyancy compensator systems continues to produce innovative products which supply added pleasure and confidence for sport divers of all experience levels. The 1984 Ocean Jacket is the latest jacket style BC and backpack combination from Parkway. Subtle design modifications from earlier Parkway units and the implementation of advanced technology make the 1984 Ocean Jacket System Parkway's best ever. The system is stylish, cleverly designed for ease of use and is built to take the abuse of tough ocean diving.

Like all Parkway BCs the Ocean Jacket is a two bag system. The inner bag is tough, yet flexible, 15 mil thick polyurethane. When inflated, the inner bladder floats freely within the outer shell to eliminate stress points. The outer bag is made of 430 denier nylon providing excellent resistance to tears and abrasion. The navy blue body and pockets of the shell are trimmed with silver-blue stripes for a handsome look. The design of the jacket panels at the shoulder utilizes a new contoured approach to add style and comfort while decreasing drag.

An especially desirable feature of the 1984 Ocean Jacket is the inflation system. The Softouch power inflator is supplied as a standard item and the accompanying advantages should not be overlooked. Utilizing the Softouch makes one-handed inflation a breeze. It allows precise inflation/deflation control, an aspect that can be appreciated by those who wear mitts or gloves for protection in cold water; by divers with small hands; and all other divers who desire the benefits of feather-light touch control.

Oral inflation is convenient as well. A Velcro® band keeps the inflator hose in place on the front of the jacket, making it easy to locate. Distinguishing between the power inflation button on the side of the hose and the oral inflator/deflator button is easy because of positioning. This design helps eliminate mistakes by divers trying to trim buoyancy. The spiral inflation hose is one inch in diameter, creating an unrestricted air flow.

A Quick Dump valve on the top left shoulder is a major asset. Slightly pulling down on the inflation hose will open the valve, enabling you to decrease buoyancy with speed and ease. You do not have to change your position or hold the hose high above your head.

Several additional features are valuable benefits. Two large pockets, perfect for keeping slates, shells and other objects, are just above waist strap level on each side of the jacket. Velcro closures provide security and an inch of free material between the Velcro strip and the bottom front edge of the pocket make grabbing the pocket a simple task. The back of the pockets are nylon mesh, enabling them to drain rapidly.

A 25 gram CO₂ cartridge and detonator system intended for emergency use on the surface is behind the left hand pocket. Activated by a pull toggle, the mechanism is a corrosion proof, high impact plastic with a stainless steel firing pin. If properly maintained, the detonator system can be counted on.

Velcro hose guides are provided for both an octopus second stage and a console hose. The guides help keep your diving system orderly and make hoses a

snap to find.

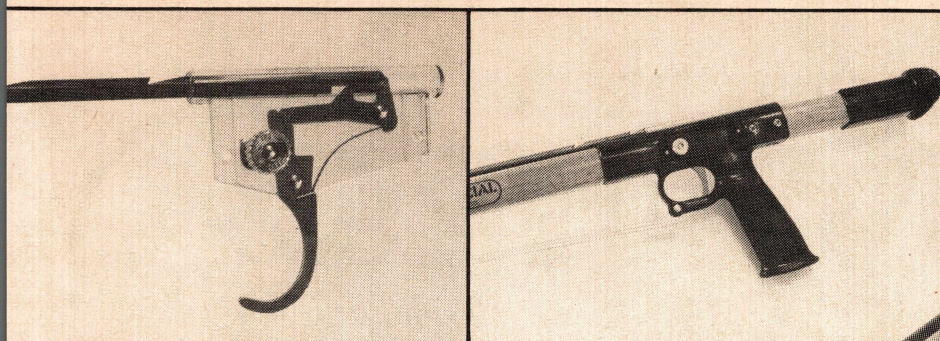
At the bottom of each of the adjustable side panels there is a stainless steel D-ring. These are the ideal place to attach your hand lights, goodie bags and other such accessories.

The Ocean Jacket System concept is derived from the fact that the unit contains both a jacket compensator and a Parkway Sofpack. While the jacket is compatible with most backpacks and can be purchased separately, it is the addition of the pack that completes the system. Constructed of high impact plastic, the molded backpack is contoured for comfort. A handle at the top makes the system easy to grab and control. The backpack attaches to the jacket via a Velcro strap that can be secured in a matter of seconds. A reinforced, rubberized pad on the back of the compensator where the tank, jacket and backpack join, significantly increases the unit's durability. The backpack employs a camlocking tank strap made of nylon webbing. Like most nylon tank straps, it has a tendency to stretch slightly when wet and needs to be adjusted accordingly. A strap system of nylon webbing and a stainless steel waist buckle complete the package.

Knowing that a compensator system incorporates a lot of features is nice, but the true test is how the unit performs in and around the water. Comfort, reliability and ease of use are essential criteria. In tests, I found the contoured shoulder reduced bulk and made the system easy to doff and don on land as well as in the water. Modifying the fit for different builds is made possible through the use of adjustable side panels and the chest strap which tightens down the front of the jacket. The 44 pounds of lift (fresh water) held my head high out of the water without creating any undue pressure on my throat, chest or diaphragm. The deflator was easy to find and rapid deflation with the Quick Dump valve was a simple task. I find that feature a major advantage to boat divers who want to descend quickly at times when current is a consideration. U/W, I found the backpack to be comfortable and the unit to be at least as streamlined as most other jacket systems.

When trying to decide if the 1984 Ocean Jacket System meets your needs, it would be wise to remember that your BC is the heart of your diving system. No other piece of equipment plays such an important role in safety, comfort and your ability to perform as you desire in the water. With those factors in mind, I think you'll find the 1984 Ocean Jacket to be an excellent choice.

Suggested retail for the Ocean Jacket System (catalogue number VES81223) is \$322. For more information contact your local Parkway dealer or: Parkway, 241 Raritan St., South Amboy, New Jersey 08879.



The stainless steel trigger mechanism of the 36 Special is a replaceable cartridge which slips into the top of the grip section. The gun has a wooden body, and butt cap, muzzle and grip of nylon.



ABBiller Sea Hornet 36 Special

Your Choice of 8 Models and Teak or Mahogany Stock & Barrel

TEXT AND PHOTOGRAPHY BY FRED FISCHER

Will it be South American mahogany or teak? That is a choice you will have to make when selecting one of the beautiful ABBiller Sea Hornet wooden barrel rubber band spearguns. There are eight models which vary in size from 32 to 48 inches and are equipped with or without a line for freeshafting.

According to Fred Biller, president of the ABBiller Company, the Sea Hornet is used in competition diving more than any other gun. It was originally designed in Australia where spearfishing is almost a national sport. For the American market only the handle, muzzle and butt cap are imported while the rest of the parts are fabricated at the Illinois plant.

I was given the Sea Hornet 36 Special to examine for this article. The use of quality materials was evident. Selected wood which has been sealed and varnished is used for both the barrel and butt stock. Wood is a buoyant material and eliminates the problems of leaky O-rings and corrosion which often develop in sealed aluminum barrel rubber band guns. Also, the in-water sound is more muted and perhaps less frightening to many fish. The muzzle, grip and butt cap

are all injection molded from black nylon, a very rugged material often used in spearguns for these applications. For long term durability only hardened stainless spring steel is used in the shaft.

Two one-half by 14 inch gum rubber bands, with solid stainless steel wishbones, are supplied with the gun. Space for an additional band is not provided. An optional three notched shaft is available at extra cost. The notches in the shaft are contoured to minimize the wear on the wishbones. For improved accuracy the shaft rests in a shallow groove along the top of the barrel. The muzzle, however, does not align the pull of the bands with the shaft.

A twin barbed rock point tip with six mm threads is attached to the 5/16 inch diameter shaft. The range is limited to nine feet by the 500 pound test braided nylon shock cord, which includes an elastic length adjustment. The line runs close to the barrel to minimize entanglement while you are swimming.

The stainless steel trigger mechanism is designed as a replaceable cartridge which slips into the top of the grip and is the essence of simplicity. The action is exceptionally smooth for squeezing off a shot. The safety is the weakest link in the design of the gun. It prevents the acci-

dental firing very well: While holding the gun in the right hand, one must rotate a dial with the left hand to either the safe or fire position.

The extra large area of the butt cap is most appreciated when you are loading the 36 Special as it distributes the forces over a wider area of the body. Sighting is direct, from the top to the trigger cartridge to a prominent point on the muzzle.

All of the Sea Hornet guns come with a one year warranty against defects in workmanship. Routine maintenance should include a good freshwater rinse after use. The ABBiller Company offers an extensive array of replacement parts and tips. The craftsmanship which goes into the tips is especially noteworthy.

In conclusion, the 36 Special is a medium weight general purpose speargun for taking the most common fish around the reef. When it is powered by the accessory 5/8 inch bands I would be tempted to use the spring steel shaft on larger fish. The retail price of the 36 Special in mahogany is an economical \$110.90. Because of the rarity of the wood, the teak version is \$134.90. The whole collection of Sea Hornets is definitely worth going out of your way to find. For more information contact the company at P.O. Box 316, Bloomingdale, IL 60108. 

AQUA-LUNG PRO LINE COMPRO

A lightweight fin
with plenty of power

TEXT AND PHOTOGRAPHY
BY MARTY SNYDERMAN



To the eyes of inexperienced and experienced divers alike, many fins appear much the same. In fact, today's fins look a great deal like the original pair made in 1935. But that visual similarity can be quite misleading. From a visual standpoint, what generally appear to be minor changes in fins yield major improvements in the products' in water performance. The Aqua-Lung Pro Line Compro fin is the latest from U.S. Divers and it is a classic example of just how far fins have progressed.

The Compro fin is the result of extensive research and development by the U.S. Divers staff. Conclusions concerning the ideal fin for the average sport diver were drawn after conducting in-depth analysis of the muscular efficiency of divers' kick strokes. The end result was the Compro, a lightweight fin that produces a greater power-to-weight ratio compared to previous models. An open heel fin that can be adjusted to properly fit a variety of shoe sizes, the Compro is proving to be comfortable, durable and popular.

Until recently, dive fins were usually made of neoprene rubber. Compro fins are, however, constructed from a composite of materials. The blade is ethylene vinyl acetate (Elvax®), a thermoplastic elastomer from DuPont. Another thermoplastic, Mabor® by Rublex, is utilized for the foot pocket. The blade and foot pocket are then thermally bonded together.

The combination of materials yields a product that is of high strength, extremely tear resistant, and comparatively unaffected by ultraviolet rays or ozone.

The Compro was designed to perform in an ideal manner. The blade is angled slightly from the foot pocket to take into consideration the way your foot is attached to your ankle. This feature minimizes ankle stress while providing maximum thrust. The blade construction takes advantage of the larger, more powerful quadriceps muscles during the downstroke. The fin is designed to maintain pressure against the water over the entire surface area of the blade during the downstroke while its vents decrease water resistance during the upstroke. The ribbed outer edges of each fin and the short ribs at the vents help increase lateral stability. The overall effect is a fin that provides an optimum performance with minimum effort.

When testing the Compro's performance, I was favorably impressed. The fin

provided plenty of thrust without unduly tiring me and I found the foot pocket comfortable. The fin straps have a heel tab, an item that allows you to more easily pull the strap into place. These are ribbed and angled slightly backward, making them easy to grab.

Compros come in blue with a black foot pocket and white with a black foot pocket. On both models the blades are semi-translucent. The fins are attractive and photogenic.

For divers who want additional thrust, U.S. Divers makes a stiffer Graphite Compro (\$60). It is intended for people such as commercial divers and instructors who are especially strong and in the water constantly.

Compros utilize the latest technology in design and construction, providing a fin that produces more efficiently directed power through less effort. The suggested retail price is \$55.

For more information contact your local Aqua-Lung Pro Line dealer or: U.S. Divers, 3323 West Warner Ave., Santa Ana, California 92702. 

OUR SECRET IS BAFFLING.



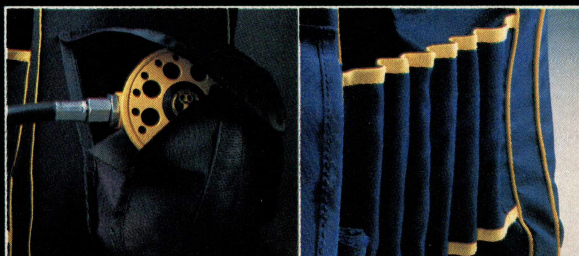
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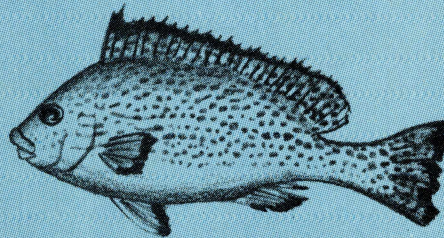


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The Sweetlips

(*Plectorhynchus picus*)

Grunts do exactly what their name implies: they grunt. Their distinctive trademark is their ability to produce short, deep, guttural sounds, audible both underwater and topside. They accomplish this by grinding their pharyngeal teeth together, with the sound amplified by the swim bladder. The Spanish name for grunt is *ronco*, which comes from *roncar* (to snore). □ A number of grunts that occur in the waters of Australia are called sweetlips by Australians, and one species, *Plectorhynchus picus*, stands out among them. Almost the entire fish, dorsal, caudal and anal fins included, is bespeckled with purple-brown spots. □ The sweetlips is an Indo-Pacific fish that occurs in Australian waters off New South Wales and Queensland. It should not be confused with the painted sweetlips (*P. pictus*), a more silvery fish that shares the same range. The sweetlips grows to about two feet as an adult and lives in coral and rocky reef areas, hanging close to the bottom or near a rocky outcrop. It is not difficult to approach the fish underwater, for like all grunts, it remains in a semi-inactive state during the day. □ Haemulidae (now the accepted name for the grunt family, replacing the former Pomadasyidae) comes from the Greek meaning bloody gums. This is in reference to the characteristic bright red



mouths of the grunts. Some of the grunts are known to engage in a kissing act: Two individuals come face to face with open mouths and push against each other. It is uncertain whether this behavior is a courtship ritual or an act of territorial aggression, but in either case, the subaqueous smooching of the grunts has long been a popular subject for underwater photographers. □ The Haemulidae is very closely allied to the snappers (Lutjanidae), and ichthyologists separate the two families on the basis of their tooth structures. Snappers have stronger canine teeth and grunts have pharyngeal teeth (in the region of the pharynx, where the gills are lodged). While maintaining many of the physical and behavioral characteristics of the snappers, grunts are smaller in general. Both families are nocturnal and carnivorous. By day grunts hang motionless in suspended animation and at night, spread out over the reef to feed. They forage for shrimp, crabs, sipunculids, echinoids and polychaete worms. □ *Plectorhynchus* is a large, Indo-Pacific genus of the family and many of these fishes have striking color patterns. There is a great variation in color patterns between juveniles and adults and the younger fishes are typically banded while the adults tend to become speckled. 🐟

Photo By Chris Newbert - Text By Hillary Hauser

Newbert took the photo in 50 feet of water on Osprey Reef, Australia. He used a Canon F-1 with a 50 mm macro lens in an Oceanic housing, an Oceanic 2003 strobe. ASA 25, f16, two to three feet from subject.



AUTOMATICALLY TIMES AND RECORDS DIVES AND SURFACE INTERVALS

Ikelite DIGITAL DIVE LOG is the ultimate water proof watch and dive timer. The DDL 1000 is unmatched in the marketplace. The small microcomputer combines the features of a sophisticated watch and automatic dive timer.

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The DDL 1000's watch function displays time of day, day of week and date, with alarm, stop watch, and back-light features.

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TIME OF DAY



STOP WATCH



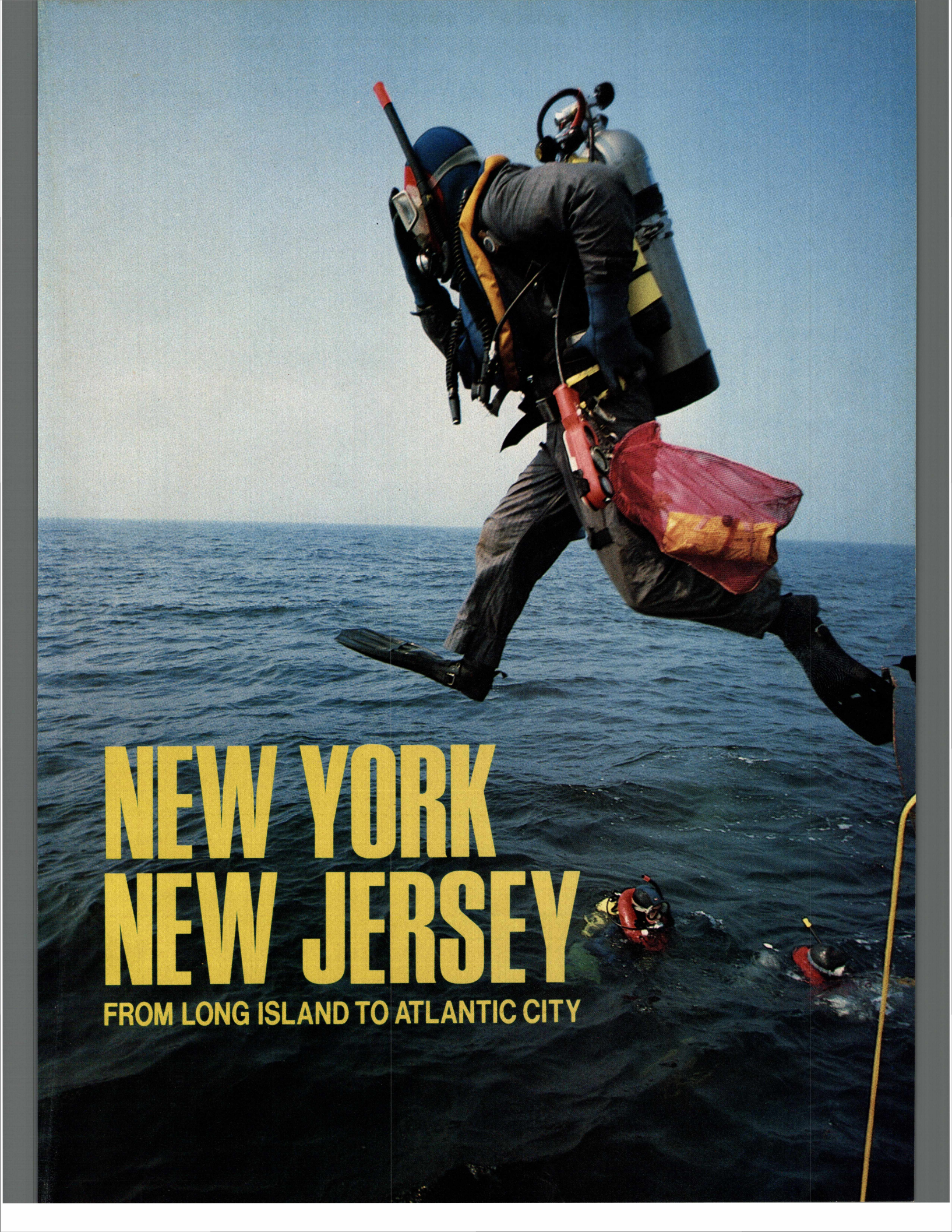
BOTTOM TIME



SURFACE INTERVAL



MEMORY RECALL

A full-page photograph of a diver in mid-air, jumping from a boat into the ocean. The diver is wearing a blue helmet, a grey wetsuit, and a large silver scuba tank. A red mesh bag is attached to their gear. The ocean is a deep blue with small waves, and the sky is a clear, pale blue. In the lower right, two other divers are visible in the water.

NEW YORK NEW JERSEY

FROM LONG ISLAND TO ATLANTIC CITY

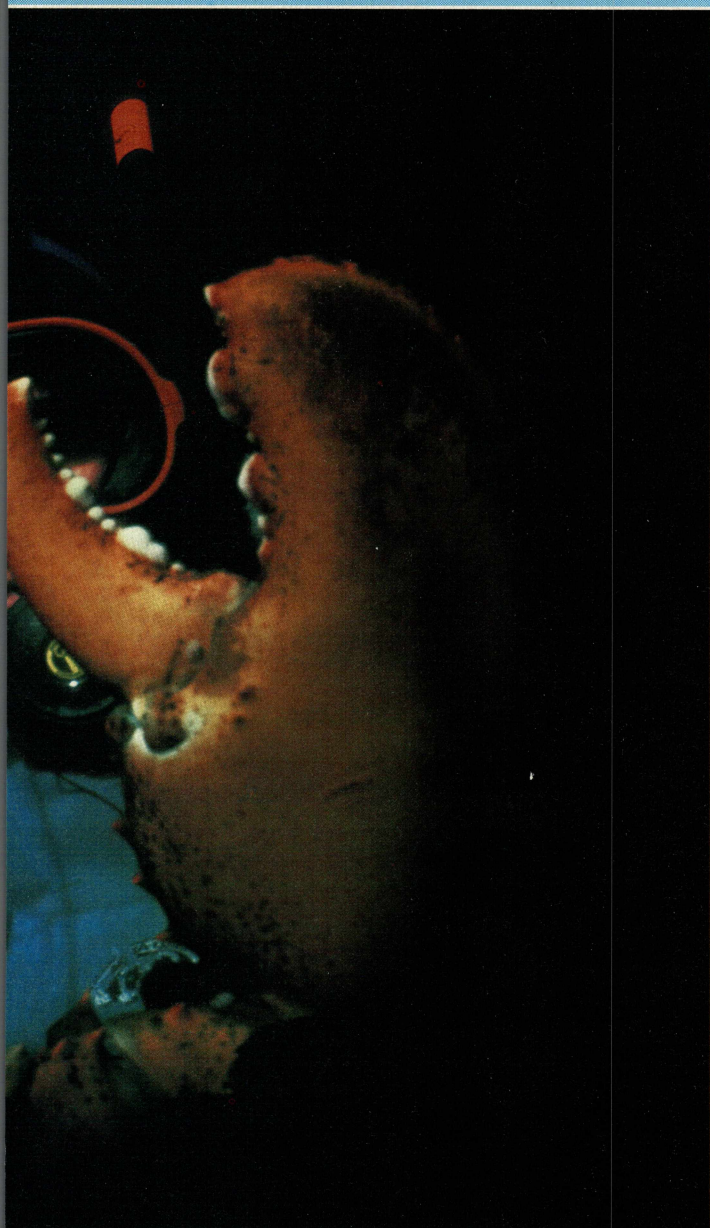
NEW YORK NEW JERSEY

DIVING IN THE VALLEY OF THE WRECKS



Above: A lucky diver displays his catch—a huge East Coast lobster. Right: The dive boat *Sea Hunter II*. Opposite page: A diver holds a porthole recovered from the *Oregon* wreck. The New York/New Jersey area offers experienced divers and beginners boat and beach dives, wrecks, lobstering, photography and spearfishing.





TEXT AND PHOTOGRAPHY BY JOE BERESWILL AND AL BOEHM

There are hundreds of reasons to wear "I Love New York" and "New Jersey & You" buttons. There are the Atlantic City casinos, nightlife, beautiful beaches, summer resorts, sailing and fishing. The "Big Apple" features Broadway shows, restaurants, ethnic neighborhoods and Long Island's tremendous coastline, home to summer visitors and year-round residents alike.

But beyond all these cultural and entertainment attractions, each year more and more divers are showing their love for New York and New Jersey by donning their wetsuits and exploring the surrounding waters.

Why dive metro New York? Most divers would immediately mention the Valley of the Wrecks, the world famous sunken ships (over 500) that honeycomb the approaches to our nation's busiest seaport. But, also within a southerly and easterly range of the Statue of Liberty, at the entrance to New York harbor, are miles of beaches and clean waters that offer almost every type of diving imaginable.

Just as New York, New Jersey and Long Island offer visitors many different vacations, the same area serves a complete menu of underwater experiences to divers of all levels, from beginners to veterans, that includes lobstering, artifact hunting, spearfishing, exploring wrecks, photography, dives from boats and beaches, rivers, lakes and quarries and a whole lot more.

Busy housewives, stockbrokers, painters, musicians, police and firemen (and thousands of others) somehow arranged their schedules to allow weekend diving on favorite metro wrecks and beaches.

Recently, however, increasing numbers of out-of-town divers, visiting the area on vacation or short business stays, are bringing along their wetsuits, masks, regulators and fins for an extra night on the town and day underwater. Many charter boats operate on weekdays as well as on weekends.

A typical first time visit to the area probably would start in the Big Apple, with a show or concert. The diver then might plan a trip east, to Long Island, to dive a local shallow wreck, such as the *Black Warrior*. This sidewheel excursion steamer sank off the coast in February 1859 and is a favorite historical dive for spearfishermen, photographers and beginning divers. A beach dive might follow next, possibly at Rockaway Inlet, near Beach 8th Street, where bright yellow and orange sponges are a highlight. Heading east, another popular wreck might be the *Iberia*, a steel freighter that



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NEW YORK

sank with a full cargo of dates in 1888, after a collision at sea. A visit to Fire Island's artificial reef, a 60 foot boat dive, is also in order, since it's an ideal site to develop a good sense of what kind of animal and plant life can be expected in metro waters.

Farther on east, the Ponquogue Bridge is a good midway point to pause and refresh with a local beach dive. The Shinn-

cock Inlet, so-named for the local Indian tribe which first inhabited the area, is a 20 foot dive that is a must for photographers practicing their macro skills on colorful sea anemones, small crustaceans and soft corals.

Spearfishermen might want to consider Blackfish Rocks at Montauk Point, the far eastern tip of Long Island, as a next stop on their journey, followed by a visit to

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Greenport, an old fishing village on the island's north fork.

Greenport is host to a variety of shore diving. Within a short distance of its piers, bottle collectors have a field day finding old inkwells, medicine jars, etc., while the famous War of 1812 ship-to-the-line, the U.S.S. *Ohio*, lies nearby in some 20 feet of water, easily reachable by a short swim from shore. Farther west, in 15 feet of water and a stone's throw off Nassau County's northern Gold Coast, is the wreck of the *Glen Island*. This 19th century steamboat, which went down in the winter of 1904, provides a continuing supply of brass spikes, small pieces of



silverware and memorabilia of the ship's 10 passengers and 21 crew members.

On the way back to New York City, a stop at any one of a number of different north shore beach locations for lobstering and wreck exploration is the perfect way to finish L.I. diving. And, after a good night's sleep, a favorite place to wash salt from gear is in the fresh waters of Lake Mahopac, just an hour's drive north of the city. This site is also a top choice for divers searching for old bottles, artifacts and mining implements.

After a brief rest in New York City again, it's off to explore some more metro wrecks, like the *Pinta*, a cargo ship sunk in the early 1960s at the entrance to the harbor. The *Pinta* is both an ideal underwater studio and museum for photographers and artifact hunters and it's a good example of how Hollywood might perceive an underwater wreck: intact, lying on its side and easily explorable on a single dive. During the late summer months, schools of large stingrays and triggerfish are often spotted on this wreck, which is accessible by boat from the New York and Jersey shores.

Heading south, popular beach and jetty dives can be found at Shark River Inlet, where clams, mussels, lobsters and sea bass abound. The back waters of this area are a favorite fish collecting haunt, with many tropicals and seahorses calling this area home for the summer.

The next stop probably will be Point Pleasant Briele, a pretty surfside beach community that is port for a number of

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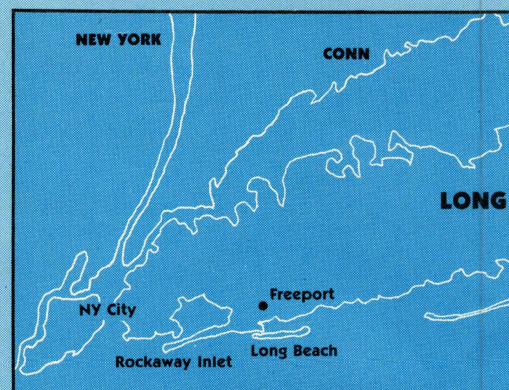
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NEW YORK

New Jersey charter dive boats. One of their popular wreck sites is the S.S. *Mohawk*, a steel hulled passenger liner that lies in 75 feet of water near Manasquan Inlet. And, no journey south would be complete without some truly exciting beach dives from other quaint seaside towns and villages that dot the coastline.

For a wreck dive by boat, visit the *Great Isaac* tug, sitting in 85 feet of water, off Surf City. The ship is upright and practically intact, after colliding nearly 40 years ago with another vessel. The dive



site yields many artifacts and photographers find it especially enjoyable because of its abundant marine life. Any new diver to the area would have a difficult time passing up a visit to the "Las Vegas of the East," Atlantic City, with its famous boardwalk, fast paced night life and glittering casinos. For real excitement, though, a trip to the *Almirante*, named the Flour Wreck by local divers, is definitely in order. This turn of the century cargo ship sank almost 70 years ago in 60 feet of water near Brigantine. It is a year-round haven for schools of big sea bass and lobsters. While all this good diving and sightseeing should be a natural letdown for the ride back to New York City, happy thoughts and memories will make this two and one-half hour trip go faster than most.

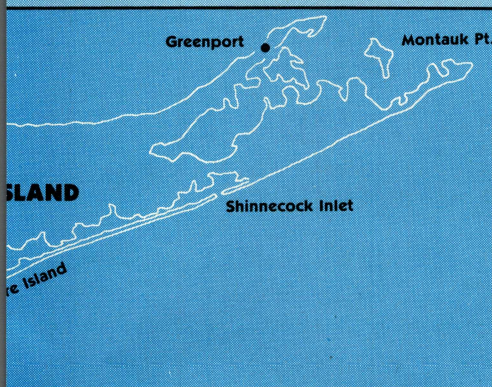
Historically, New York harbor and its New Jersey and Long Island approaches have been the crossroads of the New World. The noted pirate, Capt. William Kidd, lived in a house on Manhattan Island, just a few blocks from today's South Street Seaport Museum. His ships, often laden with prized treasure, plied the waters off Long Island. During the Revolutionary War the rivers and bays surrounding New York City were filled with British ships. And, in the two great world wars, enemy submarines patrolled the nearby coastlines and torpedoed many of the freighters and tankers that headed for

the harbor. Today, divers explore the remains of these ships, victims of war, fire, collision and fierce storms.

More divers than ever are learning that metro area wreck diving means brass, bugs and bottles; fun, sun and laughter; new friends and old acquaintances.

But divers aspiring to explore some of the deeper wrecks should first have a number of shallow dives under their belts. Wrecks like the Stone Barge (50 feet) and *Acara* (20 feet), off Freeport, L.I.; the *Mistletoe* (25 feet) and Granite Wreck (20 feet), near Brooklyn, NY; and the *Adonis* (25 feet) and China Wreck (20 feet), at Long Beach and Avalon, NJ, are excellent starting points.

It's a good idea to learn to relax and become comfortable while charter boat



diving on these wrecks before venturing farther offshore to sites such as the *Stolt Dagali*, a tanker sliced in half nearly 20 years ago by the Israeli passenger liner *Shalom*. The wreck is south of the harbor, closer to Jersey, but easily approachable from both shores. The stern of the *Stolt* sank but the bow was saved and eventually returned to service after being welded to another vessel. The stern section, wedged in the sand on an angle, is as shallow as 60 feet and as deep as 130. The impressive size of the wreck, coupled with the exceptional visibility (50-90 feet) usually found there, make it a highlight of NY/NJ diving.

The World War I cruiser, U.S.S. *San Diego*, off of Fire Island, L.I., is one of the most famous and exciting dives on the East Coast. Originally named the *California*, the 504 foot vessel was lost during WW I. She was sunk by a German mine in the summer of 1918. She lies upside down, intact, in 110 feet of water. Her hull rises to within 55 feet of the surface, making it an ideal dive for beginners and experienced explorers.

There's a number of different, exciting things to do on the *San Diego*. First, you can tour the entire ship if time permits, since the hull forms a gigantic reef for bergalls, blackfish, bass, lobsters, hake, flounder and an occasional pelagic visitor. Or, a diver can drop over the side of the hull and view the huge six inch guns

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NEW YORK

that protrude from the wreck like telephone poles. Or, if it's a souvenir you're after, a quick stop in the ammunition room, just forward of the propeller shaft, will yield clips of 30 caliber bullets. The bow still has one of its giant anchors in place, making it an ideal photo prop.

Southwest of the *San Diego*, in 75 feet of water off the Jersey coast, lies the S.S. *Mohawk*, one of the largest and most widely scattered wrecks in the area. This 387 foot passenger vessel met its fate on a cold night in January 1935 when it collided with the Norwegian freighter, *Talisman*. The New York Times reported 33 dead, 13 missing and 118 passengers and crew saved in the accident. The great attractions of wreck diving include not only exploring the remains of a ship, but also learning the history behind it. Knowing about the tragedy that struck this ocean liner lends a special sense of adventure to a *Mohawk* dive.

Another interesting wreck, the *Gulf Trade*, is in different locations, offering two distinct dive sites near Barnegat Inlet. This 423 foot Gulf Oil tanker was split in half on March 10, 1942 by a German U-boat's torpedo. The bow part floated toward the shoreline and came to rest in 50 feet of water. Because it posed a hazard to local navigation, the Army Corps of Engineers eventually blew it apart. It's still an interesting dive, however, and a hiding place for large lobsters, flounders and other marine life. The ship's stern, which drifted aimlessly following the attack, sank in 85 feet of water. Unlike its sister section closer to shore, the stern is totally intact and an ideal artifact dive.

A good distance southeast of Barnegat Inlet, in 110 feet of water, lie the remains of a dramatic cargo steamship wreck, the *City of Athens*. This elegant vessel met its fate in spring of 1918 when it was rammed by the French heavy cruiser *La-Glorie*. *City of Athens*, with all of her passengers and crew, sank to the bottom in less than ten minutes. For divers visiting the wreck, visibility often exceeds 75-100 feet and its huge boilers, which at the turn of the century helped speed the ship across great oceans, are home to many large lobsters. The wreck is a key draw for artifact seekers looking for old bottles, china and eight millimeter LaBelle ammo with the date marked clearly on each.

DIVING SEASON

While diving is year-round, the most popular time to explore the area is from May to late October. Water temperatures (in the 50-60 foot range) vary from 60°F in May, to the comfortable high 70s in August and September, dropping in fall.

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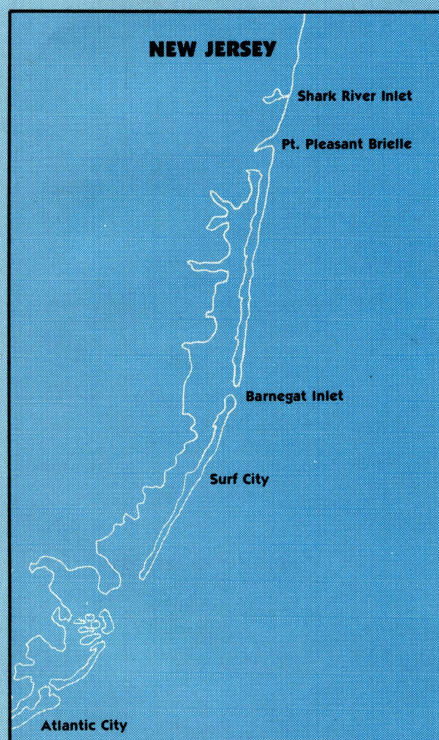
NEW JERSEY

A one-quarter inch wetsuit and hood provide more than adequate diving protection and neoprene boots and gloves add even more comfort. These waters are known for their thermoclines, as many as two or three layers on some of the deeper wrecks, and divers can expect to find them even in the summer. Remember to keep this in mind when you're planning a deep dive.

With a drysuit, it's possible to dive all year, enjoying the thrill of ice diving in the region's northern lakes and quarries as well as lobstering from a snow laden beach. Regardless of when you dive in the Northeast, local experts caution that most of the time is spent on the boat, above water and passengers should bring enough warm, dry clothes to offset any sudden wind chill.

THE WATERS

Geologists point out that the beach and land formations of metro New York/New Jersey are both alluvial (wind and water



transported) and glacier deposited. The two contrasts provide variations in the nutrient-rich waters that support a large variety of marine life. The waters, which can range in visibility from 70-110 feet, to as little as three to five feet, are fed in varying degrees by warm Gulf Stream currents. These originate many thousands of miles away from our continent, flow up past South America and the Caribbean,

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NEW JERSEY

and pass closest to the U.S. in Florida and the Valley of the Wrecks. During the birth of our nation, Postmaster General Benjamin Franklin recognized the importance of these currents and commissioned the first charting of the Gulf Stream to aid in routing mail ships from the colonies to Great Britain.

Divers recognize its importance too, for at certain times of the year the fast moving Gulf Stream brings a kaleidoscope of marine life to the metro area, starting with tropical fishes of all sizes, shapes and colors, to tiny seahorses and huge rays. Joining these creatures are giant leather-back sea turtles, porpoises and seals, ocean sunfish called mola molas, and a variety of whale species. It's not uncommon to see and photograph the smaller marine life that inhabit the shallower wrecks, bays and inlets, while their big brothers and sisters pop up unexpectedly on some of the offshore dive sites.

BOTTLES

As this country's first center of commerce, the waters surrounding New York, New Jersey and Long Island abound with the discards of bygone generations. Old glass and ceramic bottles and jugs, which are becoming popular with collectors, fit this category.

Each year, as changing tides uncover sections of centuries old wrecks, more bottles and artifacts are discovered. Many a metro diver has found a lobster and an old bottle in one crevice.

One of the prime bottle wrecks in the entire country is the *Lizzie D*, in 75 feet of water, just a few miles off Long Beach, L.I. The *Lizzie* was a prohibition era rum-runner, one of the thousands that crept quietly at night into the area's secluded coves and canals and unloaded the treasure of the day. Not too much is known about the *Lizzie*. She was a large ocean tug that left her home port of

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Brooklyn, NY on the night of October 19, 1922 and was never seen again. That is, until seven years ago when divers, alerted by local fishermen, entered the clear water and saw a once in a lifetime sight: a virgin wreck. Sitting upright, its big bell was intact, its brass portholes gleaming and its decks brimming with case upon case of bootleg whiskey bottles. Since then, the *Lizzie* continues to yield round, square and oblong bottles, many still full, as one of the most popular day and night dive sites in the Valley of the Wrecks. After she was reported missing by the crewmen's families, a local congressman intervened and a massive sea search was ordered. While official government documents end here, there is speculation that the *Lizzie* was spotted by federal authorities scouting for rumrunners and that she ordered full speed ahead. With the chase on, so the rumor goes, she caught fire and sank. The true story may never be known, but what is certain is that no crew member was ever seen or heard from again.

While wrecks are a sure bet when you are looking for old glass, the best bottle hunting grounds in the area are just a short breath or two away from the shallow piers and docks of the older fishing villages and 18th and 19th century communities. Areas such as Long Beach and Brigantine in New Jersey, the Rockaways and Breezy Point in New York City, Greenport and Montauk on Long Island, and the many freshwater lakes, rivers and quarries provide hourlong, one tank dives and the opportunity to return to shore with a piece of history.

LOBSTERING

"Bug" means one thing to local divers—the northern lobster, king of all crustaceans. He is stalked and pursued like big game prey in the shadows of sunken ships and rock formations that provide a natural refuge.

Metro wrecks provide an ideal setting to learn the exciting art of lobstering or gathering bugs by hand. Only a few simple tools are needed: a mesh bag, bright light, quick reflexes and last, but not least, cool, calculating nerves. Large lobsters (seven pounds and more) can be found on wrecks in depths of 50 feet or more, making this a year-round sport.

Searching for the northern bug is a little different from hunting its Caribbean cousin. To start, begin a slow, methodical search; being extra careful not to stir up silt from the bottom. Look for the first telltale signs, tracks in the sand that lead to a crevice where you'll often see whip-like antennae waving in the current. The smart thing to do next is observe. Determine its approximate size and crusher claw position, two key safety checks. Remember that the crusher claw is not always on the same side and that it's thicker and lined with white serrated edges, while the cutting claw, much nar-

rower and pointed, has no white.

Coordinate the timing of your catch by grabbing the outside edge of the crusher claw with one hand and, in the same move, clasp the edge of the cutting claw. With both claws in your hand, exert a steady pressure and slight rotating movement to remove the prize from its den. Any hesitation or misjudgment can result in a badly bruised hand. Small bugs (under two pounds) can be taken easily by inserting your hand over their claws, hooking two fingers over their body and pulling. If you're unfortunate enough to be grabbed by a large crusher claw, a quick twist of your arm will help minimize any injury by dismembering the claw (the lobster will grow a new one).

In the summer months, metro area bugs migrate into shallow waters and can be found hiding among large rocks and rough bottom areas in five and ten feet of water. Inlet jetties and bridge abutments, such as those at Shinnecock, Long Island and Shark River, New Jersey also are good lobster spots. 

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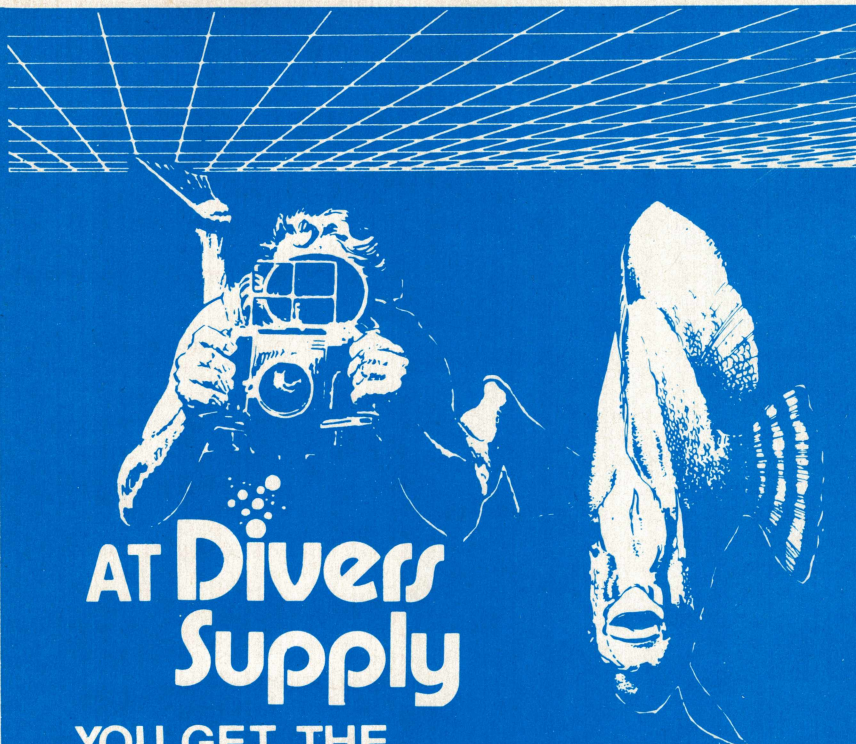
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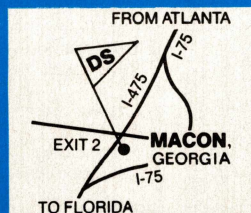
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SUNSET DIVERS WREATH

Sunset Divers of Grand Cayman, British West Indies, celebrated Christmas a little differently. Patrick Davis, dive-master, and his wife Doris, a local school teacher, decorated Armchair, a large sponge 70 feet below the water's surface. A six foot Christmas tree was gently settled in the lap of Armchair and decorated. A garland and a wreath were then placed along the arms of the sponge.

Great care in the decorating process was taken to leave the beautiful sponge, as well as the living reef area, undisturbed and undamaged. Cayman Islanders pride themselves on the emphasis placed on preservation of the marine life around the islands. 🐠

FRANK'S ISLAND FANTASY

Frank's Dive Store and Charter Service has renamed its new 90 foot mini-cruise ship, *Island Fantasy*.

Frank's Fantasy Fleet is designed to give a diver, whether novice or pro, comfortable dives in the Palm Beaches and the Bahamas.

For reservations call Tim at Frank's Dive Store in Riviera Beach, Florida. 🐠

BONAIRE FILM/VIDEO COURSE

Professional underwater cinematographer Bill Lovin will teach a course in motion picture and videotape techniques at the Flamingo Beach Hotel on Bonaire. The week-long course runs August 4-11.

The course is designed to teach professional production techniques to those currently shooting Super 8 or 16 mm film as well as still photographers who want to break into underwater motion pictures and videotape. Students will have the opportunity to work with 16 mm cameras, lighting equipment and video systems. Every aspect of production, from script to final lab work, will be discussed.

Professional model Susan Abbott will assist with the course and teach underwater modeling techniques. She will be available to work with students.

For more information about Bill Lovin's underwater film and videotape course contact the Flamingo Beach Hotel. 🐠

MARATHON DIVERS

The Key Colony Dive Center has moved its operations to Marathon, FL. The owners, Jack and Rita Ferguson, have also decided to change the name of the shop to fit its new location. Henceforth, they will be referred to as Marathon Divers. Inquiries should be addressed to Marathon Divers, 12650 Overseas Hwy., Marathon, FL 33050. 🐠

SDM travel

SECTION

It has been nearly a year since I first visited Anthony's Key Resort on the island of Roatan, 35 miles off the coast of Honduras. I recall a sense of unease preceding that first trip owing to the well-publicized political instability in Central America. In retrospect, those fears were fallacious and I found instead a gratifying vacation in a location of immense beauty. Consequently, the feeling preceding this year's trip was one of anticipation rather than apprehension. And once again, the only surprises were pleasant ones.

Roatan is a world apart from whatever hostilities might be occurring elsewhere in Central America and Anthony's Key Resort is a secluded world apart from Roatan. AKR supplies its own water from wells, electricity (110 volt) from its own generators and back-up generators, and is a self-sufficient small community. There are 52 double occupancy cabins situated either on Anthony's Key or the terraced hillside. Most of these are of recent construction, but the quaint flavor which has so distinguished Anthony's Key Resort in the past has been retained. Like the old bungalows, these new structures are built from native woods with louvered wooden slat windows for privacy and access to the cooling breeze. Each has a ceiling fan and private bath with shower. The improvements are subtle but important; better screens, shingled roofs rather than tin for better insulation and more modern plumbing. Still absent are telephones, television and radio, for this is a resort at which to relax and truly get away from it all.

Most of the rooms are on Anthony's Key, the small, palm tree studded island from which the resort derives its



ROATAN'S BEST AKR Expands

TEXT AND PHOTOGRAPHY
BY STEPHEN FRINK

name. The Key is only 50 yards from the mainland via the toll free water taxi which runs continuously. The Key accommodations are favorites owing to their privacy and isolated island atmosphere. There is a special convenience to the rooms at dockside, though, since they are close to the dive boats, photo center, restaurant and bar. And the rooms on the hillside probably have the most spectacular views. Thus, while each particular cluster of cabins may have its own personality and advantages, any of the 52 would be suitable. Resident manager Julio Galindo has instituted further improvements as well. Working

closely with partner and dive operations manager Peter Hughes, he has developed a fine fleet of dive boats and first class diving operation. The 42 foot *Don Pablo* is the most recent addition to the fleet. It is a wooden boat built on the island to comfortably accommodate 28 divers, although standard capacity on any given day is less than that. There are two other boats of similar design and size, as well as the 33 foot *Rainbow Runner* which can accommodate both divers and sportsfishermen. One of the unique aspects of the fleet is that all engines are interchangeable, and can be installed within one hour. This means that should one diesel engine be temporarily unrepairable, a spare can be quickly installed and no diving is forfeited. In all of the Peter Hughes dive operations standard procedures call for backup systems for the backup systems and this comforting practice is evident throughout the resort.

The photo center at Anthony's Key

travel

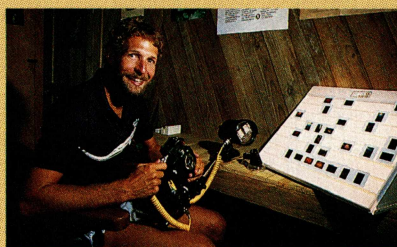
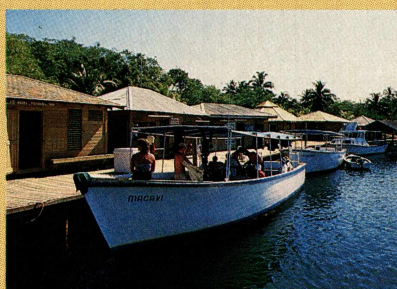
Resort has developed nicely under the able direction of resident pro Charlie Kafer. In addition to overnight E-6 (Ektachrome, Fujichrome) processing, Charlie offers camera equipment repair and rental, underwater portraits for guests, film and battery sales, slide shows, instruction leading to the PADI U/W photo certification, and even color printing. Roatan is a long way from anywhere and for the serious underwater photographer it is very reassuring to realize competent help is on staff should a problem occur.

There are other touches which further distinguish the resort. For example, there is a herd of very healthy horses to ride, boardsailors and sailboats and miles of uncrowded beaches to explore. At Anthony's Key Resort all activities are included in the package price. The only difference is between the diver and non-diver package. Even the food, which is tasty and well-balanced, is not rationed. Should the guest want seconds or thirds, it is permitted. There are only two or three selections per meal, but quantities are certainly ample. It should be noted, however, that the food service and bar is 54 steps up a fairly steep hill. For some people with handicaps this might present a problem.

Most of the dive sites are within 15 minutes of the resort and more than 30 of these sites are regularly visited by the dive boats. During this year's stay we experienced diving substantially different from my recollection of the previous year's. There are simply so many good dive sites along the island that I suspect it would require many, many vacations before the diving ever felt stale.

Among my favorite dive sites from this trip are the following:

Mary's Place: One day we were plagued by high winds on the north side of the island, where AKR is located, so we traveled 45 minutes by boat to the south side, where it was much calmer. Under most weather conditions the north side is protected, but when it is undivided, Mary's Place is quite spectacular. We anchored just at the edge of a vertical wall that



Clockwise from above: Charlie Kafer, resident photo pro; AKR dive boats; new waterside units at the resort; a huge barrel sponge at Peter's Place.



dropped from 50 to 120 feet. Apparently an earthquake struck along this reef splitting it parallel to shore. The result is two distinctly different walls and the shoreward wall is actually more magnificently adorned than the seaward wall. There are fabulous sponges everywhere in purple, red, white, orange, brown and black. The dive boats generally visit this reef once a week and while the boat ride is longer, it is worth it.

Half-Moon Bay: Coral canyons lead to a vertical wall from 45 to 120 feet, but most of the best can be seen within a maximum 100 foot depth. There are large barrel and tube sponges, all manner of hard coral and gorgonians, black coral and azure vase sponges.

Peter's Place: Named for Peter

Hughes, this reef offers both beautiful shallow diving and a good wall. We anchored in 15 feet of water and swam seaward past large stands of pillar coral and sponge encrustation. There were swarms of black surgeon, bermuda chub and sergeant major as well as good populations of angelfish and other reef tropicals. There were numerous fish cleaning stations and more marine life activity than I had seen at most of the other dive sites.

Anthony's Key Resort is unique and one of the very special diver destinations of the world. To experience it firsthand contact: Anthony's Key Resort, P.O. Box 26556, Minneapolis, MN 55426 or call toll free (800) 328-0734. Minnesota residents may phone (612) 546-8461. 

A PERSONAL INVITATION FROM CARL ROESSLER

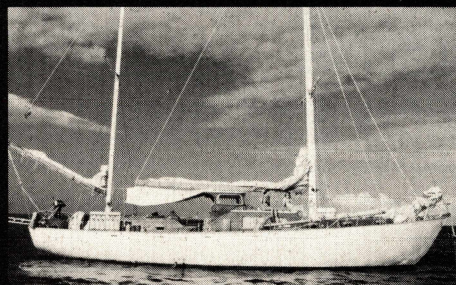
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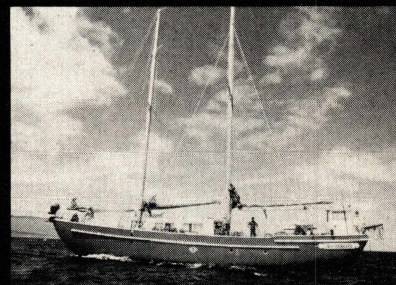
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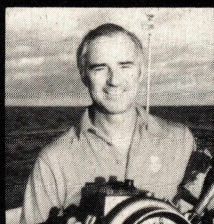
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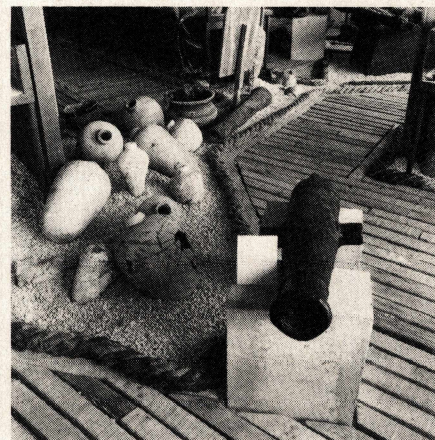
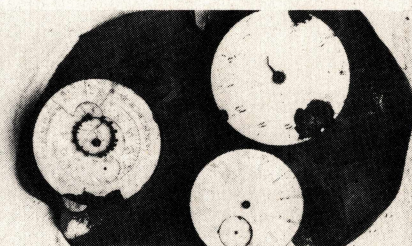
PETERSEN PUBLISHING COMPANY

Attn: Nora King, 6725 Sunset Blvd., Los Angeles, Ca. 90028.

CEDAM MUSEUM

CEDAM opened its newly renovated nautical archaeology museum earlier this year. The museum, conveniently located near the heart of Cancun's resort district, offers a glimpse of shipping and trading activities between Spain and the New World that occurred between 1500 and 1700. The museum also offers an account of early CEDAM International and CEDAM de Mexico activities.

Among the artifacts on display are: bronze and coral-encrusted cannon, pot-



tery, jewelry, tableware, coins, crosses, statues, swords, muskets, bullets and iron pots. All of these artifacts were recovered by CEDAM members.

In addition to the museum in Cancun, CEDAM has also assembled an underwater museum in Akumal, 60 miles south of Cancun. Here, in approximately five feet of water, snorklers can experience the excitement CEDAM members felt upon discovering the 40 Cannon Wreck. Artifacts include several coral-encrusted cannons and an anchor. Bring your camera: Akumal bay is loaded with colorful tropical fish.

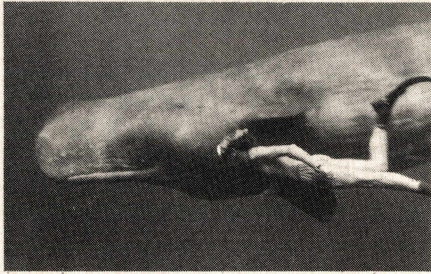
The museum in Cancun is open 11:00 am to 6:00 pm Tuesday through Sunday. Admission is \$2. Admission to the underwater museum is free.

CEDAM International is a non-profit society dedicated to Conservation, Education, Diving, Archaeology and Museums. Membership is open to dedicated divers, nautical archaeologists, explorers and marine biologists.

For more information on the CEDAM museums and CEDAM contact: CEDAM International, Fox Road, Croton-On-Hudson, NY 10520.

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Diving Safaris Ltd. is a custom dive operation serving the Nassau/Paradise Island area of the Bahamas since 1976. The organization operates a 28 foot Bertram boat to reach dive sites quickly and provides all food, equipment and refresh-



ment for the diving day. Snorkeling trips are offered, with scuba at an additional charge. Charters are available to wrecks, deep reefs and walls. Guests can request their dives be photographed by Captain Paul Harding.

For further information contact Diving Safaris Ltd., P.O. Box N9067, Nassau, Bahamas. 🌿

FILM EXPEDITIONS

Airtour Universal, in cooperation with International Television Productions, is offering dive tour packages to people interested in participating in underwater shows. Participants have a firsthand chance to study and work as underwater cameramen, light technique specialists, video or sound recorders and underwater photographers.

An expedition July 14-21 features remote dives on Grand Cayman, Little Cayman and Cayman Brac. A TV show will cover the wrecks of East End and the outer bank. It will also visit a virgin location to film a sunken freighter.

The August 17-25 expedition to the Red Sea will explore miles of coral reefs, exotic marine life and wrecks.

The Galapagos expedition, November 24 through December 1, will film sleeping sharks, sea lions, marine iguanas and other wildlife.

For information contact Airtour Universal, in Fort Lauderdale, FL 33334. 🌿

SEA FEVER

Sea Fever Diving Cruises has hired Diane Brewer as chef aboard the 90 foot live-aboard *Sea Fever*. She was formerly with Royal Caribbean Cruise Lines.

Steve Simpson has also joined Sea Fever Diving Cruises. He is engineer/divemaster as well as a PADI open water instructor. Simpson is a graduate of Detroit Diesel Technical School and will be directly responsible for all machinery maintenance aboard the *Sea Fever*. The vessel is powered by triple, turbo charged, 12 cylinder engines. Sea Fever Diving Cruises operates five day trips from Miami to the Bahamas and Cay Sal Banks. 🌿



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TORTOLA VACATION

The Treasure Isle Hotel on Tortola in the British Virgin Islands is offering an Ultimate Sailing Experience, an eight day/seven night vacation package for four or six persons. First, guests spend three nights at the hotel, at the water's edge. Facilities include freshwater swimming pool, tennis courts, squash, sailing, deep sea fishing, scuba, snorkeling, boardsailing and waterskiing.

Included in the package price are all transfers; air-conditioned accommodations; welcome rum cocktail; carafe of wine; use of tennis and squash courts; use of facilities at Cooper Island Beach Club; an underwater slide presentation; gift from management; day trips to island beaches and chaise lounges.

Once you've explored the pleasures of the shore, it's off to taste the sea for four nights on a 44 foot sailing yacht which has everything you need, including snorkeling equipment, a dinghy and outboard motor. You take to the sea and set your own course—beachcomb, cruise, sail, snorkel, swim or relax in a secluded, palm-fringed cove on any of the beautiful British Virgin Islands. >

HALL/SEA OF CORTEZ

Howard Hall, underwater photographer and film producer, will lead an expedition to the Sea of Cortez Aug. 19 through 25 aboard the *Don Jose*. Underwater photography of the gulf's marine life will be the theme of the trip and the majority of the expedition's seven diving days will be spent at the Marisla Seamount and Animas Island.

During evening hours, Hall will offer lectures and slide presentations dealing with Sea of Cortez marine wildlife and his techniques for photographing these animals. For more information write: Howard Hall, Box 99970, San Diego, California 92109. >

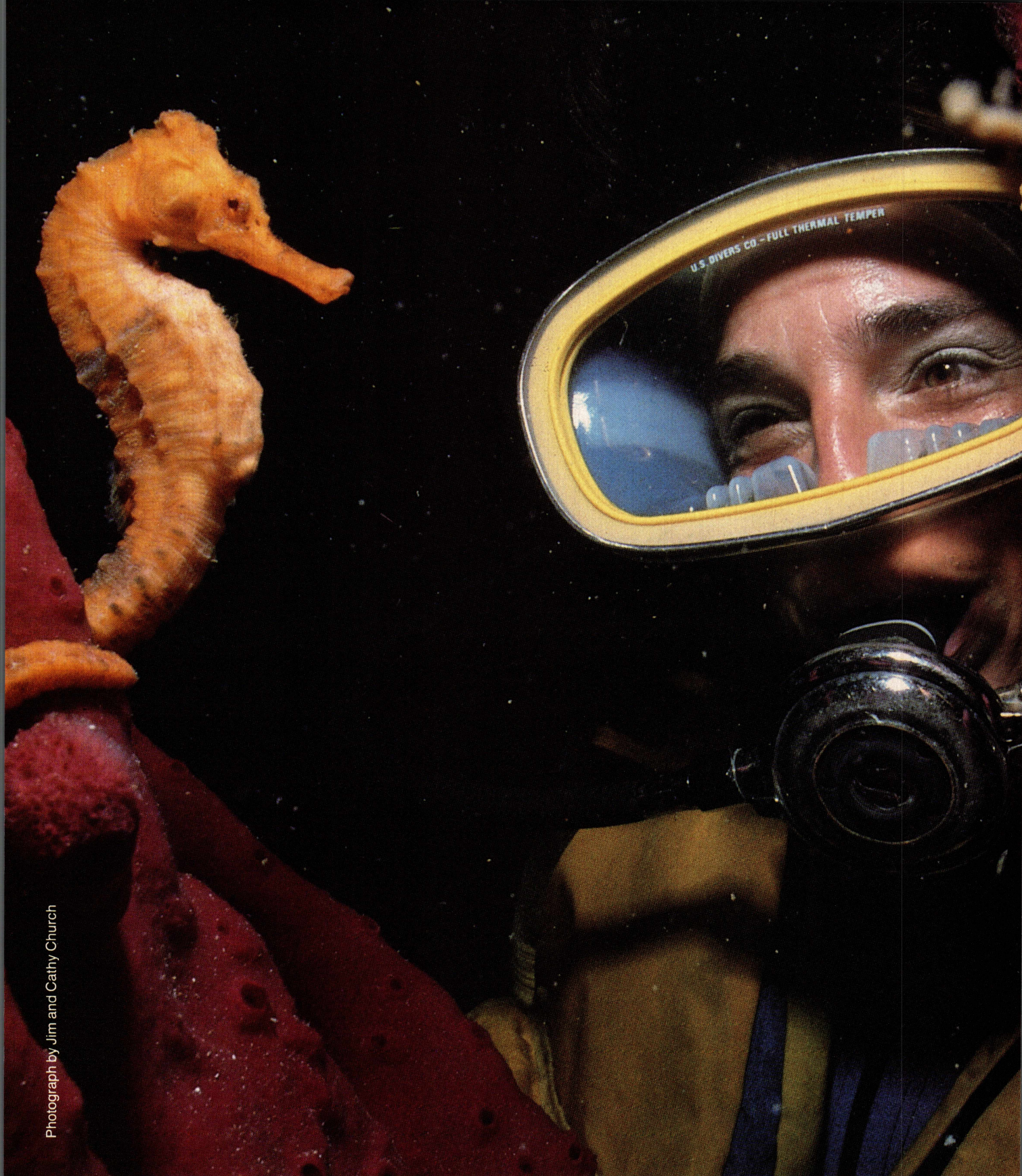
STERN/SEE & SEA

See & Sea Travel, Inc., of San Francisco has appointed Naomi Stern as north-eastern sales representative. From her office in New York City Stern will attend dive meetings and call on dive stores throughout the northeastern states.

An avid and widely traveled diver, Naomi Stern has taken See & Sea diving adventures all over the world. Her expertise regarding See & Sea's worldwide diving operations make her an excellent source of information and advice. >

WATERS/DELIVERANCE

Jay Waters was recently promoted to chief instructor and captain of the dive boat, *Deliverance*, operated by Caribbean Sea Adventures of St. Croix, U.S. Virgin Islands. Caribbean Sea Adventures services six hotels including the Buccaneer and the King Christian. >



Photograph by Jim and Cathy Church

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Left to right: Dr. and Mrs. Carl Edmonds, Dr. Bruce Bassett, Dr. C. Gresham Bayne.



Photo/Barbara A. Currie

DIVING DOCTORS DOWN UNDER

Medical Milestone
At Heron Island

BY BARBARA A. CURRIE

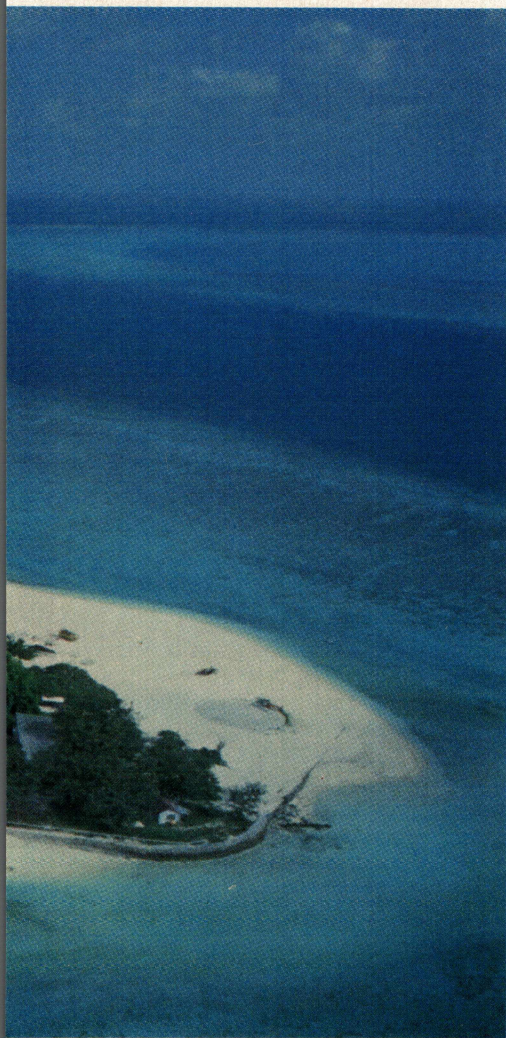
While Australia's team was sailing into history by capturing America's Cup, a group of Americans was making history in the Land Down Under in the world of scuba diving.

This was no ordinary dive group, however. In September, Human Underwater Biology, the San Antonio, Texas based organization which sponsors Diving Medicine in Depth programs for physicians, received recognition as the largest group ever to travel to Australia since that country's tourism industry began to develop less than a decade ago.

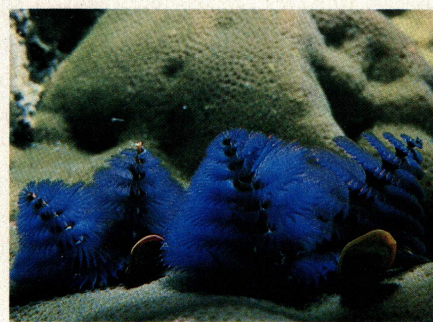
Led by HUB president and program director Dr. Bruce Bassett and trip coordinator Anita Bassett, the 63 member medical delegation spent two weeks participating in HUB's first Diving Medicine in Depth program focusing on "Undersea Medicine in Australia." The HUB session was the first program of its kind in Australia for foreign physicians.

The group flew to Sydney on Qantas, the national airline of Australia, to begin the first part of the 14 day program at the Regent Hotel. The three day program featured lectures and presentations by five authorities on diving medicine: Dr. Bruce

Left: An aerial view of tiny, isolated Heron Island. Fifty miles off Gladstone on the Queensland coast, Heron Island is famous as a nesting site for birds and sea turtles. Right: Guests reach the island on helicopters.



A sea turtle lays her eggs in the sand on Heron Island. Below, left to right: Heron Island guests make a boat dive; beautiful blue Christmas tree worms; a tasseled wobbegong shark. The reefs around Heron Island offer a wide diversity of marine life.



photos/Geri Murphy

Bassett, Ph.D.; Dr. C. Gresham Bayne, UC at San Diego; Dr. John Knight, president of the South Pacific Undersea Medical Society; Dr. Ian P. Unsworth, director of hyperbaric medicine at the Prince Henry Hospital in New South Wales; and the featured program speaker, Dr. Carl Edmonds, director of the Diving Medical Center in New South Wales and a consultant on all aspects of diving medicine to the Royal Australian Navy.

During free hours, HUB members sampled some of the fascinating attractions in and around Sydney, including a harbor cruise, tour of the Koala Sanctuary and north beach areas; a visit to the McArthur

district, birthplace of the Australian wool industry, and an evening at the world famous Sydney Opera House. The sight-seeing tours were arranged through Sydney's leading tour operator, AFIT.

The HUB group then flew 1,000 miles north to the tiny 42 acre resort, Heron Island, for the continuation of the program. Fifty miles off Gladstone on the Queensland coast, Heron Island is famous as a sanctuary and nesting site for an estimated 75,000 birds each year; the nesting ground for some 700 sea turtles representing six species; and for its location at the southern tip of the Great Barrier Reef.

The completely self-contained 68 room

resort and 22 sea lodge complex provided HUB members comfortable accommodations and excellent cuisine, while offering not only conference facilities but also a variety of nature and reef walks and other opportunities to become acquainted with the unique ecosystem supported on the island and in surrounding waters, which are a National Park area.

The HUB Heron Island session provided participating physicians with a broad range of specific information not only on problems associated with diving medicine in general, but also on the problems of sport diving in environments normally beyond the scope of U.S. experience.

(Continued on Page 128)

PHOTO BONAIRE

Photo Bonaire has expanded to include an air-conditioned classroom and A/V room. Video courses will also be offered using the JVC-VHS recorder system. Facilities are available for viewing results and minimal editing. Now, both 35 mm E-6 slide film and any VHS format video can be analyzed on a daily basis.

PADI specialty courses in underwater photography are available on a weekly basis throughout the year in either 35 mm film or video.

DIVER'S DREAM MIAMI

Key Biscayne, Florida is the site for a new, one stop dive operation, featuring the *Sea Eagle*. The 53 foot custom aluminum boat has twin diesel power, is fully air-conditioned and was built specifically for diving. A 16 foot dive platform and 14 foot inflatable chase boat add to both safety and convenience. The *Sea Eagle* has passed rigid coast guard examinations and carries both ocean and SOLAS certifications. Although authorized for 49 passengers, only 25 divers will be carried. Dive trips will be run to Biscayne Bay wrecks and local reefs, including those in Pennekamp Park as well as in the Bahamas Islands.

Hotel packages will be available on the

Bahamas trips. For divers desiring to explore Biscayne Bay on their own, a fleet of 21 foot boats is available for rental.

An integral part of the operation is the Eagles Nest dive shop. It offers the only dockside air fills in the Miami area and a full line of rental equipment. The Eagles Nest is managed by Len Chaikowsky, a PADI instructor and underwater photo pro. Scuba certification programs are available.

SKIN DIVING ADVENTURES EXPANDS

Dave McLeod's Skin Diving Adventures of Bermuda has acquired Blue Water Divers. At the White Heron Country Inn, in Warwick, Blue Water Divers' newly refurbished 42 foot custom fitted dive boat increases the size of McLeod's fleet to three large boats. The 42 foot *Meridian*, 40 foot *Bonanza* and 30 foot *Seeker II* can accommodate more than 100 divers per day.

The Blue Water acquisition also adds a new Mako K-15 compressor and considerable new equipment to Dave McLeod's dive operation.

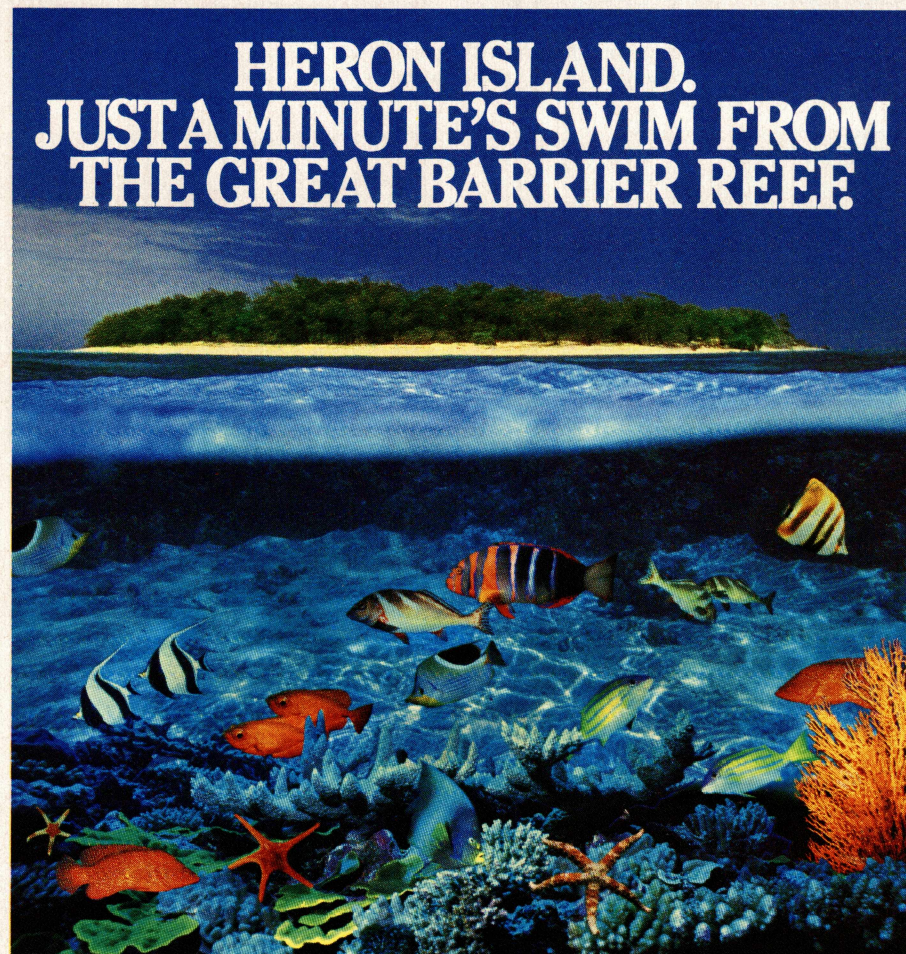
Skin Diving Adventures offers a complete range of diving services, including resort course instruction, PADI and SSI certifications, equipment rentals and repair service, deep dives, night dives and daily two tank trips to Bermuda's remote wreck and reef sites.

Future plans include the expansion of the facility at Robinson's Marina, the development of a retail outlet at the Blue Water Divers location, the addition of another new dive boat and more.

TROPIC BIRD CRUISE

The Paul F. Romberg Tiburon Center for Environmental Studies and San Francisco State University are sponsoring a 14 day diving expedition and cruise of the British Virgin Islands July 6-20. The Dive the Caribbean tour will offer participants the opportunity to study the tropic ocean ecology by daily scuba and snorkeling dives off the specially equipped, 98 foot dive boat *Tropic Bird*. William Pence, a specialist in coral reef ecology and marine researcher at the Tiburon Center, will lead the tour and lecture daily on coral reef ecosystems, geography and social history of the islands.

Crew members of the *Tropic Bird* are all licensed scuba instructors, so those without experience may learn to snorkel or become certified scuba divers within the first five days of the cruise. The cruise will include night diving and a number of dives on shipwrecks including a WW II Liberty Ship and the *Rhone*. *Tropic Bird's* sailboard, Sunfish sailboat and dinghy will be available for recreational use, and for exploration of several of the uninhabited British Virgin Islands scheduled as part of the cruise itinerary.



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Heron. It's just a drop in the ocean.

The tour cost includes all air, land and sea transportation; meals; scuba and snorkeling equipment; an average of two or three dives each day; daily lectures that explain what will be seen during the dives; and fees for two units (optional) of upper division biology credit at San Francisco State University. 🐠

LUCAS/RED SEA

La Mer and New England Divers, Miami are offering a two week excursion Sept. 18-Oct. 3 to the Red Sea hosted by Steve Lucas. This package includes ten days of diving aboard the 85 foot American yacht *Fantasea* featuring luxury air-conditioned cabins, a carpeted saloon, a large dining area, three bathrooms and a fully equipped galley.

Travel arrangements are first class hotels (double occupancy), all transfers, three meals per day, escorted tours and diving equipment (i.e., tanks, backpacks, weightbelts). The diving includes trips to the three submerged islands of Ras Mohammed, Beacon Rock and the famous Tiran Straights. Lucas will offer special photographic counseling to all trip members.

Plans have been made to spend two days in Israel prior to the dive/cruise complete with private guided tours of historic and modern Jerusalem, an air-conditioned drive along the Dead Sea and a visit to Massada. A tour of Cairo and the pyramids is planned. 🐠

FLORIDA PACKAGES

Lady Cyana Divers and Howard Johnson's Ocean Resorts, Islamorada, Florida Keys are offering three, four, five day or longer dive/accommodation packages.

The packages include daily dive trips aboard the 40 foot *Lady Cyana*, free air, use of tanks and weightbelts, accommodations at Howard Johnson's Ocean Resorts, a complimentary welcome drink on arrival and optional breakfast and dinner plans. Packages including scuba certification courses are also available.

The Coast Guard inspected *Lady Cyana* departs twice daily, at 8:30 am and then again at 1:30 pm for a two tank, two location trip. Dive sites range in depth from 15 to 120 feet and include miles of beautiful coral reefs, the modern day wrecks of the Spiny Oyster Barge and the Cannabis Cruiser, and even the remains of sunken Spanish galleons. Each dive trip is suited to the interests and abilities of the divers on board.

Lady Cyana Divers is an international training facility and professional dive shop offering a complete selection of rental equipment, air, sales, service and instruction in addition to the daily reef trips aboard the *Lady Cyana*. Captains Joan Follmer and Ken Wright both own and operate the dive boat and the dive shop, assuring their customers personalized service. 🐠

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DANGEROUS DUDLEY DOES CAYMAN

BY STAN WATERMAN

The customs inspector surveyed the 17 cases of equipment and diving duffles with a baleful eye. The temptation to crush the mortal traveler with a bureaucratic broadside is always there. Fortunately for this weary traveler, carrying with him the massive encumbrance of equipment for a film production in the Cayman Islands, the inspector was also weary and I was the last in line.

Conspicuous among the aluminum and fiber cases was a large coffin-size cardboard box. "What's in that?," he demanded. The voice was both suspicious and curious. "Movie props," I answered. He hesitated, then, deciding that postponement of the finish to his day's work wasn't worth indulging in the law's delay, he passed the whole works. Thus did

Dangerous Dudley enter Grand Cayman.

Dangerous Dudley is, in fact, the mortal remains of an unnamed Indian, probably a lady, at that; but we'll call her/him Dudley. And, why should I be carrying about a full human skeleton in my luggage? The quest for humor in a film is the answer. In this case it was to be very black humor.

Some months earlier I had shot a film with the Benchley family for Spanish Cove dive resort. This film was for Cayman Airways. The idea for Dudley had germinated during the making of the Benchley film. In the harbor at George Town there is a much-dived-upon wreck called the *Balboa*. It's safe to say that almost everyone who dives Grand Cayman dives the *Balboa*. That means about 10,000 people explore the well-worn



photo/Margo Nelson

wreckage each year and perhaps 1,000 of these feed the fish on the wreck. Sergeant majors and yellowtails are the banqueters. Through much experience they have learned to sense even the slightest

Cayman Islands

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DLX	289	499	709	199	339	489	169	299	429	159	279	399

EXTRA NIGHT

	96	96	96	68	68	68	62	62	62	59	59	59
SUP	96	96	96	68	68	68	62	62	62	59	59	59
DLX	106	106	106	73	73	73	65	65	65	62	62	62

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EXTRA NIGHT

	116	116	116	86	86	86	79	79	79	76	76	76
DLX	116	116	116	86	86	86	79	79	79	76	76	76

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nuance of the dinner bell. They are faster on the draw than Pavlov's dog. Just start to reach for a plastic bag of food hidden in your BC and you are instantly surrounded, totally enveloped, by fish. Enter the water with a plastic bag visible in your hand and you will descend to the wreck in a cloud of fish. When feeding commences the host divers vanish from sight until the food is gone. I watched Peter and his son, Clayton, experience this alarming phenomenon and from watching what appeared to be a mass of piranhas in a feeding frenzy grew the idea for staging a disaster farce. When the bloated fish dispersed all that would remain of the diver would be a bleached skeleton.

For awhile the scheme remained nothing more than a figment of my warped humor for the simple reason that I had no skeleton and didn't have a clue how to come by one. Then a tennis partner who deals in medical publications gave me the number of a medical supply company in Virginia that handles skeletons. I was instructed to ask for Irma. Sure enough, Irma did, indeed, have charge of skeleton sales. In a businesslike voice, untouched by the spirits that had fled those mortal remains, she explained I could have a real human skeleton for \$415 or a plastic one for \$490. I was, of course, shocked by this evidence of the sad decline of human value in a plastic world. On asking why the difference in price, Irma ex-

plained that India had entered the skeleton market some years back and shipped over the real thing at a price that undersold the once popular plastic models. Obviously, our skeleton makers share the same decline that assails the steel makers of this country. To my shame I opted for the cheaper foreign import. A week later UPS delivered to my door the same box that later slipped undetected through Cayman customs.

The scene on the *Balboa* was a huge success. My model, Lisa Truitt, the lovely Our World-Underwater scholarship runner up, was "ravaged" by the food-maddened sergeant majors and yellowtails. When she vanished in their mass I stopped the camera. Paul Humann, an underwater photographer and writer, draped Dudley over part of the wreckage. We dressed our bony prop in Lisa's BC, backpack and tank, fins, gloves and face-mask, stuffed the rib cage with food, stood back and filmed again. Marjorie Lloyd, wife of the governor and an avid diver, was on location, witnessing this horror along with Paul Humann and Barbara Currie. I did cutaways of faces reflecting repugnance, horror and alarm with all three.

As if this wasn't enough, a sequel to these macabre antics was filmed in the photo lab at Spanish Cove. A HUB medical tour, led by Bruce and Anita Bassett got into the act. Fourteen doctors per-

formed dramatic surgery on the skeleton, using divers' knives. Through the magic of not-so-trick-photography they restored the carcass to the living Lisa.

The fun that audiences may have watching these perils and pratfalls is only exceeded by the fun we had producing them. The laughter and pleasure felt by all who participated is a rare and wonderful thing in any business. Fortunately for those of us who make films primarily for diving audiences, humor has always proven hugely successful.

Short of national television, the largest forum for those of us who make underwater films is the growing film festival market. We generally attend these festivals personally. Since one of the few ways an audience can communicate its response to a film is through laughter, we have found, increasingly, that devices like Dudley are well worth the expense and the effort in a film production.

Right now Dudley is resting in my attic, drying off from the Cayman adventure and preparing for a big night next Halloween. However, before we go diving again in another film I suppose I had better think about having him certified. One can't be too careful.

And lest we overdo a good thing I would recall the words of Andre Maurois: "To be witty is not enough. One must possess sufficient wit to avoid having too much of it." 

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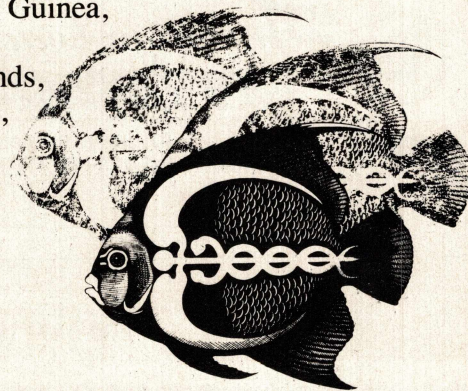
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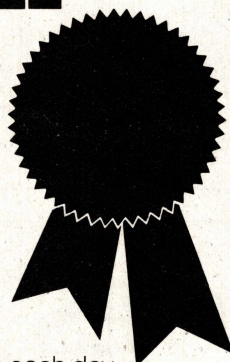
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TURRITELLA TREASURE

Biologist Dives Into
Snail Research

BY DONNA MARIE VAUGHAN

With marine biology a science in its infancy, there are only a relatively few (and these mostly intertidal) marine animals whose life history has been studied. For most dwellers of the sea, life goes on unknown and undocumented by man. My studies of the gastropod (snail) genus *Turritella* were begun to help fill this void. I chose *Turritella* because of its importance as an index fossil of the last 120 million years. An index fossil is one which is worldwide in distribution and which will date rocks in which it is found.

When I began the project I was sure it would be a simple matter to throw the dive gear in the car and head down to Baja California to watch the seashells. The guidebook said they were there: five species, 5-30 fathoms, Gulf of California. Six months and many trips later I had seen a lot of shells but no *Turritella*. At the rate I was going it would take 623 years to finish the search. Obviously, a new approach was needed.

In checking the sources of information used by several guidebooks, a pattern began to emerge. In many cases they had all copied the same reference. Many of these original sources describe the finding of the shell by dredging or being washed up on a beach. No mention is made if the animal is dead or alive. If one is found in the northern gulf and another in the south, the entire gulf is listed as the animals' range. Since few of these original sources gave the slightest clue to the type of environment (rocky, sandy, rough water or quiet) in which the animal lived, it was back to square one.

The only sources of information which would help were going to be commercial shell collectors, who protected their locations tenaciously, and sport divers. Sure enough, not long after placing wanted posters in our local dive shops, the idea paid off. Hank Nunakawa, an avid shell collector and expert spearfisherman, had seen them. Hank keeps a very good set of logbooks and in a short time found the record of the dive he remembered. His log gave the date, the depth, how he found them, a description of their trails and a map to the site—truly a treasure for any scientist.

And now, treasure map in hand, I was ready to begin my search; a few yards

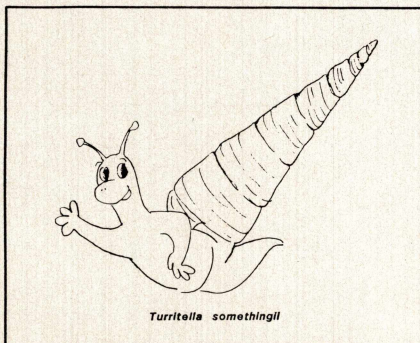
north of Carlos' trailer, on the beach south of the mouth of the Mulege River, Baja California Sur.

Ten minutes into the first dive, the first *Turritella* shells were spotted in four feet of water just as Hank had said, but, they were full of hermit crabs and not the living snail. This was more than we had seen on any other dive and if the dead shells were around the living critters couldn't be too far away. It was progress. More minutes passed and I moved out five yards

WANTED

~~DEAD OR ALIVE~~

Illustration/Raza Metas



farther from shore and turned back on the next leg of the search pattern. There, on the coarse sand, were three big *Turritella gonostoma*, alive! For several long minutes I just stared, then, remembering my finite air supply and the purpose of my trip, I got out my slate: date—Nov. 27, 1981; depth—7 feet; temperature—54°F (got to convert that to °C for the scientific report); number—three; orientation—10°, 47°, 278°; current—tidal; visibility—30 feet. I released a marker buoy in case these were the only ones. They were not. Now every few yards another pod of from 1-5 individuals appeared. Then, I hit the jackpot. In a space less than the size of two notebook pages was a group of 78.

In the next four days the surveyed area expanded and more small pods Xed on the map. No more large groups were discovered. I suspect the large group had gathered for egg laying, as is commonly witnessed by divers for other mollusks, but no eggs were seen. Field time was now running out but with the success of our main goal, the location of living *Turritella* assured, we decided to try the *coup de grace*—bring 'em back alive! We had come prepared to search and planned to leave any collecting for another trip. Now the task was to jerry-rig an aquarium for transport the 900 miles back to the paleontology lab at California State University, Northridge.

In Mulege, in my best Spanish, I negotiated for a large plastic tub, jars with lids, duct tape and a piece of plastic big enough to serve as a lid on the tub. Back in the water again, 38 *Turritella* were lifted, measured and put in a goodie bag, then sand from the area was scooped in-

(Continued on Page 92)

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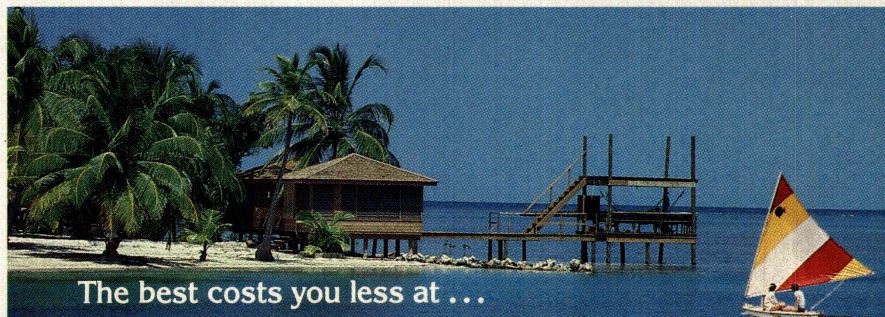
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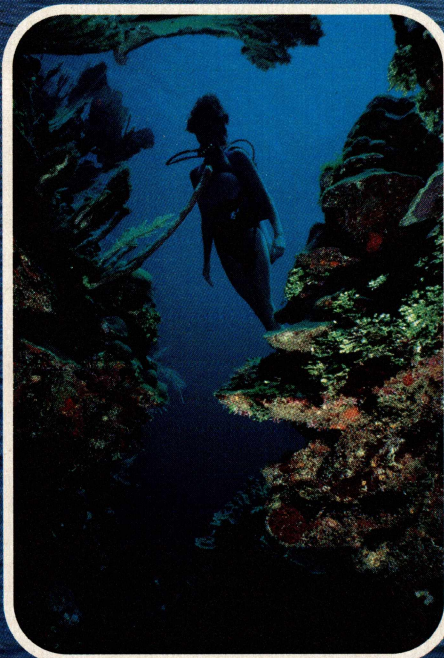
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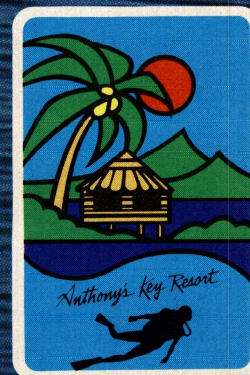
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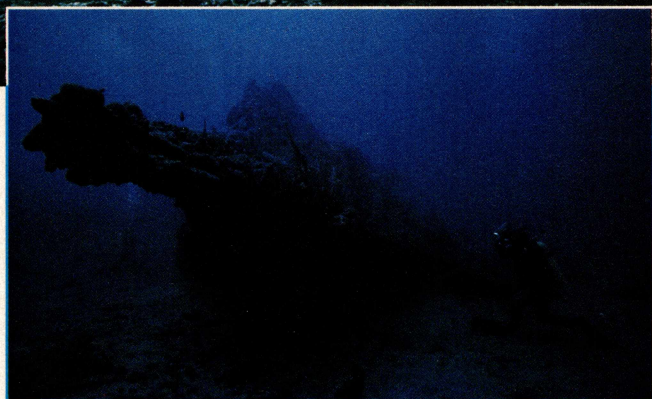


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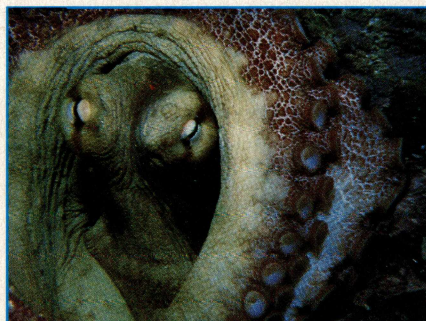
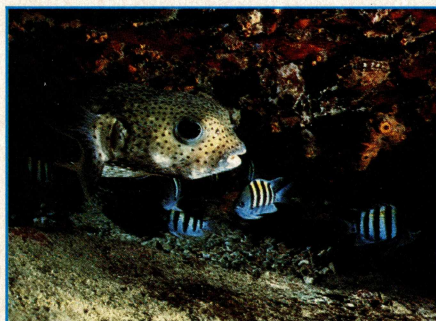


TEXT AND PHOTOGRAPHY BY NANCY FERGUSON

To experience the deep blue sea from above and below, the ultimate is the glorious *Lammer Law*. She and her sister ship, the smaller *Misty Law*, are berthed in Tortola, the British Virgin Islands. These are the waters she generally plies, all 96 feet of her tri-hulled majesty.

Duncan Muirhead designed this behemoth trimaran after years of sailing and diving experience. She was built in Canada, unfurling her canvas for the first time in 1980. She has nine staterooms, each with its own head and shower, and commodious enough for a double bed or two singles. Each also contains a chest of drawers, a dresser and enough space for two people not to bump into each other.

At the moment, Annie Muirhead is taking care of business ashore, which includes Sasha, their year old daughter.



Above: Porcupinefish, Painted Walls; Rhone; grunts, Aquarium; octopus, Lion Point.

Duncan takes charge of the boat, a situation which changes from cruise to cruise, depending on specific demands, such as vacationing crew members. And, what a crew! It pampers the guests completely. And, sites are carefully chosen to accommodate both experienced divers and instructor's charges.

Anchored at South Bay, Ginger Island, for instance, a short swim away is Alice In Wonderland, while directly below the boat is a shallow dive on coral heads on a sandy bottom. Placid and tranquil, it is perfect for lessons or a macro photographer who, perhaps, feels like taking it easy, just settling in and shooting. Of course, it's always possible that while that extension tube is busy with a red file shell or funny arrowcrab, a ray will glide by, 1,000 times too large a subject for that particular set-up. It's also possible that Duncan will lead a party of divers back from the exquisite, delicate reefs and magnificent seafans of Alice In Wonderland and have a great laugh later telling how he swam directly above you, even touching for several minutes and you didn't even know he was there.

The wreck of the *Rhone*, off Salt Island, is so well known it needs no description; less well known is *Rhone* Reef, just around Black Rock Point from the famous wreck. The cave of copper sweepers alone would make this a memorable dive; add colorful walls, the boom of white water hitting the rocks above and if you are lucky enough to make a night dive there, the eagle ray which frequents the area.

To prevent the heavy anchor from doing damage to the park (for the *Rhone* is so designated), the *Lammer Law* anchors three minutes away and Duncan runs the large inflatable dinghies to the dive site. From *Lammer Law* herself, in the opposite direction, there is a half minute swim to Lion Point. Snorkeling is fine here, since diving might mean one's tank would be out of the water most of the time anyhow. But being on scuba allows poking, very carefully, between the urchins where there is a wealth of anemones, juvenile spotted drums, high hats, moray eels, shrimp and octopus, at least one of which collects bottles.

Another dinghy ride away, behind a protecting reef in Salt Sound, is a mangrove swamp. Snorkeling here, Duncan might be persuaded to show you juveniles of all kinds, including a one and one-half inch barracuda, gigantic schools of silversides, strange little crabs (green with hairy legs) and mantis shrimp. Here you might very well be adopted by one or more pilot fish, one inch of shimmering gold and silver stripes. It's different, and a great way to use a surface interval if you don't feel like boardsailing or water skiing—both available for those with enough energy.

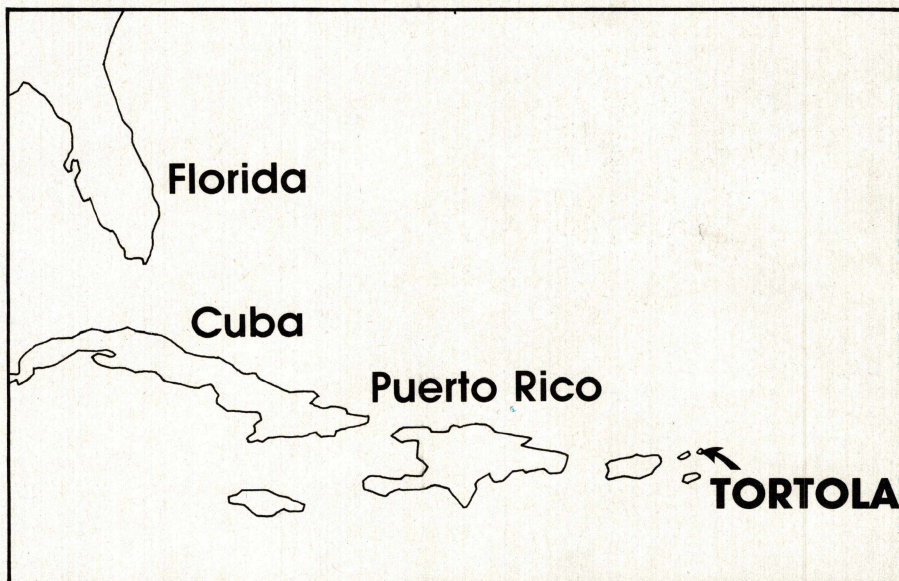
When the winds are right, *Lammer Law*

ignores her diesels; she runs out her foresail and main, her jib and staysail and soars across the Sir Francis Drake Channel. Many guests take a turn at the helm to get the feel of a sailing vessel for the first time as she tacks from one glowing emerald isle to another; steady, sturdy and serene: The largest trimaran in the world. *Lammer Law* is a thrill for all who love the salt air and fresh breezes of open water.

The anchorage at Lee Bay, Great Camanoe, provides difficult choices: Stay near to wander through the canyons of seafans, to find snapping shrimp in curly anemones and hermit crabs, or dinghy to Rinse Bollocks (yes, that's its name). The latter is a deep drift dive during which you can watch tarpon and large jacks feeding on schools of fry; and where there is always a chance of pelagics coming in to take a look at the new visitors to their world. Here eagle rays sometimes fly past and seven mako sharks have been

cove, *Lammer Law* rides the crystal water above the sun dappled sand, spilling snorkelers from her aft deck. One of the dinghies is launched and a party of divers heads for the Blinders, an offshore mirror image of the rocks above down to 40 feet, with grottoes, caves, passages, schools of jacks, blue runners, hogfish, angels, turtles and vase sponges.

After the last afternoon adventure guests are coddled with drinks and hors d'oeuvres, probably catching the fading rays of sun on the top deck which extends almost the full length and all of the 42 foot width of the boat. As it grows late there might be a spectacular sunset to enjoy. But, with or without the pyrotechnics, conversation all but masks the music from the tapedeck in the saloon below and until full dark most of the ship's complement stay topside awaiting dinner. This is served elegantly on the aft deck, weather permitting. Three long tables are joined; tableclothes, napkins and silver-



Berthed in Tortola, the *Lammer Law* cruises the waters of the British Virgin Islands.

known to make more than one diver extremely nervous.

The Aquarium, off Spanish Town, one of many sites so called, is another shallow dive, well named, for it is indeed like an aquarium. Swim among grunts, goatfish, sergeant majors, all reasonably tolerant, plus squirrefish, spotted drum, angelfish, clouds of butterflies, eels, lobster and an occasional ray, all in a quite small space where only one dive seems sinful since there is so much to see.

The Baths is a famous landmark on Virgin Gorda where boats of all description moor to gaze at the house sized boulders along the pristine beaches and to allow the sailors shore leave to explore the pools hidden in the caves. Taking more than her share of available space in the

ware laid; wine glasses placed; food brought from the amazing galley below; good fellowship and tall tales abound. It is a leisurely meal, equally so if there has been a night dive preceding it, for on this boat the only hurry is self-generated, the only danger, over-eating.

When day is done, and everyone satiated with food and drink and too tired to tell even once more the story of the big green morays at Mystery Anchor, one by one the group disappears. The lights finally go out and the only movement is the barely perceptible rocking, the only sound that of the water lapping the hull.

For more information on the *Lammer Law* contact: Trimarine Boat Company Homeport, St. Thomas, U.S.V.I. 00802. In the U.S. call toll free (800) 648-3393. 

Red Sea Cruiser

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TEXT AND PHOTOGRAPHY BY STEVE LUCAS

If the sands of time do exist, then they must certainly be scattered along the Red Sea. Among the dunes, there are precipitous mountains and along the shores are the very eons of time immortal. The stories and legends of our very beginning rise from this land: Stories many of us were first told from the pages of the Bible as children.

And the sea, too, has become legendary. Among divers who quest for the exotic, this is the pinnacle of the search. Few have experienced it, but many dream of it. I remember well reading the pages of this magazine in the late '70s when Jack McKenney wrote about what he chose to call "God's other world." In that story, and his film by the same name, he first introduced me to Ras Mohammed, Ras Um Sid and the incredible submerged islands of the Tiran Straits. The natural underwater wonders he described and filmed were more exotic than I could imagine. Little did I know how feeble a medium words and film could be until I personally experienced the Red Sea. No quantity of descriptive superlatives, nor the frames of a thousand canisters of film shot by the finest photographer can convey the ethereal delicateness of this ocean. It is now permanently etched on the emulsion of my mind. In pictures that cannot be shown, it is the most exotic, vividly hued underwater garden on the planet.

With the Camp David-agreed upon with-



Divers on the wreck of the *Dun Raven* and mealtime aboard the 85 foot *Fantasea*.



Above: Glassy minnows at Ras Um Sid. Top: Silhouette of a pyramid at Giza.

drawal of Israeli occupation from the Sinai desert, rumor spread that diving services were being closed. It was feared that with the return of Egyptian control, professional services would not continue to be offered. The rumors were not founded in truth. Almost as soon as it returned, the Egyptian government began to make efforts to secure the proper equipment, and more importantly, extend protection to the environment. In an entire country, with its pyramids, vast historical monuments and relatively few divers, it is a credit to the government's foresight that Egypt's only national park is underwater. At the urging of many concerned individuals, including those of American scientist Dr. Eugenie Clark, who met personally with the late President Anwar Sadat, the government chose Ras Mohammed as the site of the park because of its international reputation as a pristine reef. Protection from collecting corals and spear-

is outfitted with six private cabins. With two inflatables, windsailing boards, video, stereo, slide projection equipment, radio/telephone and sundeck, it has a 2,000 mile range and is as fine a diving vessel as is afloat on the globe.

Once in the Tiran Straits, the vessel sets anchor on one of the four submerged sister islands. Well marked by two massive 400 foot freighters which have run aground on the reefs in the center of the strait, they begin only 12 to 18 inches beneath the surface. On the side of Jackson Reef closest to the Sinai desert the precipice starts only inches beneath the surface and drops vertically into the abyss. The sensation is the same as that of any wall in the Caribbean except you are just a few feet beneath the surface and may spend hours instead of minutes. There the similarities end.

The life compacted into every square inch of reef and wall is dozens of times more dense than that of any in the western hemisphere. Within its first 30 feet, the water is literally alive with fish. Endless schools of two inch lyretail goldfish move in unison, only to scatter at every exhalation of a diver's bubbles. Within seconds they regroup and begin their unending sway to the rhythm of the current. Large groups of unicorn and naso tangs, with their striated patterns and brilliant colors, constantly sweep past, stopping momentarily to graze on algae that never have a chance to overgrow the corals.

Regal angelfish of the most bizarre colors and patterns fathomable slip in and out of the delicately soft, exquisitely colored, pink and red corals, turning momentarily to glance at every approaching diver. Small orange, white banded clownfish slither through the tentacles of their ever protective anemones while the royal lionfish dips his head, aiming his venomous dorsal spines at any potential predator. In the deep recesses of the soft corals, rose pink stonefish hide, raising their equally treacherous dorsal fins when threatened. The show continues almost without end through the tunnels and mazes of hard and soft corals while out in the depths large turtles and deep water predators slip in and out of view.

Nearby, on Gordon Reef, the shelf flattens out and slopes gradually into deeper water. Sand patches are almost non-existent. The entire bottom is fused tightly with 100 different types of corals shaped like fingers and plates and tables. A living trellis, it offers protection to blue, polka-dotted red grouper and lemon yellow butterflyfish beneath its overhangs, which extend horizontally to join with others.

Immense seafans spread 8, 10, perhaps 15 feet and more above the seafloor and gently wave to the whims of the water's motion, while large trees of black coral grow within 20 feet of the surface. At night the scene turns into even more

of a carnival of alien shapes. The most breathtaking of them all is the nightly flight of the crimson nudibranch, the Spanish dancer.

In addition to the wrecks of the strait, there are other large freighters which have gone upon the reefs and then slipped back into deeper water. The *Dun Raven*, at one time thought to be a treasure wreck bringing payroll to Lawrence of Arabia's desert fighters, lies in 100 feet, next to another treacherously hidden shallow shoal. Split in half, it is upside down and has a treasure of small trinkets including plates and tableware. Alive with glassy sweepers and hatchetfish, its bowels are easily penetrable. At Ras Mohammed, the wreck of the *Jolanda* is perilously perched with its bow out of water. Growths of soft corals have claimed her hulk and cargo. Nearby a giant, four foot, docile Napoleon wrasse named George makes a pest of himself as he follows divers about begging for food. His favorite delicacy is boiled eggs, which he eats from your fingers.

In addition to the unusually superb diving from the *Fantasea* offered by La Mer, the trip provides an opportunity to experience the cultural side of the Middle East. With two days planned at the beginning of each trip in Israel and two at the end in Egypt, each group has the opportunity to tour many historic places. Time is allowed in both old and new Jerusalem with an extended tour of the old city. Additionally, the tour includes Bethlehem, the Dead Sea and Massada.

The Egyptian land portion includes two days in Cairo with trips to the Museum of Antiquities, Citadel of Saladin, the Mohammed Ali Mosque, a Nile River dinner cruise complete with belly dancer and of course the great pyramids and Sphinx of Giza. Both land trips include accommodations in fine hotels with all meals at the finest restaurants. In Cairo, the Mena House Hotel is within easy walking distance of the pyramids.

The entire tour is extremely well planned with every detail completely taken care of in advance. Air arrangements are made from New York via El Al non-stop to Tel Aviv with easy connecting flights via Pan Am to New York from almost any part of the United States. Pan Am also services Cairo direct from New York City. All trips are personally led by a guide arranged by La Mer. Special trips are led by noted professional underwater photographers, scientists and journalists. If you only have the opportunity to make one truly exotic dive trip in your life, this is the one! There is nothing else with which to compare it.

For additional information and a copy of La Mer's color brochure write: La Mer Diving Seafari, Inc., 823 United Nations Plaza, Suite 810, New York, NY 10017, or call (212) 599-0886. ✉



Amos Nachoum, La Mer Divng Seafari.

photo/Linda Donaldson

fishing has been extended not only to the park but to most adjacent and nearby major reefs. Well equipped dive hotels have been established at strategic locations and equipped with an assortment of dive vessels.

In addition to the Egyptian controlled, land based operations there are live-aboard yachts of exceptional quality, such as the American registered *Fantasea*, based in the Red Sea. By exclusive agreement with the New York based La Mer Diving Seafaris, the 85 foot vessel cruises south from the Israeli port of Eilat. Owned by Howard Rosenstein, who formerly operated Red Sea Divers Center in Sharm El-Sheikh, the vessel is capable of carrying 20 passengers. To maximize comfort, La Mer and Rosenstein have chosen to limit the maximum to 10. Fully equipped for ten day stretches of live-aboard diving, the vessel is comparable to a fine floating hotel. Exquisitely prepared hot meals are served in the plush, carpeted saloon or on the foredeck. Fully air-conditioned, the well appointed yacht



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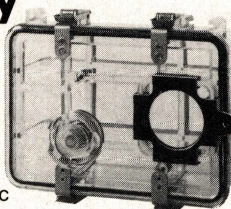
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TURRITELLA

(Continued from Page 87)

to plastic baggies until there was enough to fill the tub a few inches deep. On shore, the sand went in, then the water and when it had all settled, the *Turritella* were added. To maintain an air supply for the 24 hour drive back, an adapter hose was hooked to a scuba tank and the valve opened slightly to keep air bubbling into the make-shift aquarium. The lid was taped down and we headed home.

It was my son David's job to help balance the aquarium on the rough Baja roads and keep water spillage to a minimum. In spite of his heroic efforts, we were still six hours out when the last water bounced out around the ill-fitting lid. Most mollusks can be out of water for some time with no great harm and we hoped these were no exception. Each animal retracted inside its shell and lay quietly on the wet sand. We would save our extra jars of sea water for the lab. By evening, the university was in sight and the guard waved our dirt-covered car through the gates and up to the science building loading dock. In a flurry of activity, startled geology students were pressed into service to carry jars, scuba tanks, hoses and the tub. The whole procession wound up two flights of stairs and into the paleontology lab just as professor Richard Squires was leaving to lecture to his evening class across the hall. He was astounded and commented, "I never expected to see living *Turritella* in my whole career." But it was class time and he could spare only a moment's glance at the inert forms on the sand.

While he lectured, we added the extra saltwater, hooked up a full scuba tank and generally made our captive charges more at home in their plastic tub. Hopefully, they would resume their normal activity. According to all of the scientific literature, *Turritella* "have scarcely the power of locomotion and can move only to avoid being buried." We had seen them move underwater and in the tub but could they still perform for witnesses? Dr. Squires, unable to contain his curiosity any longer, gave his class an early and slightly longer break and rejoined us in the lab. It had been almost an hour since we added the water and for ten minutes the professor watched as the *Turritella* went through all of their tricks. They crawled all over the sand, up the walls of the tub and over each other demonstrating to science what divers had long before observed: *Turritella* have no difficulty moving their long shells anywhere they want to go.

In the following months more collecting was done and the critters moved to a proper glass aquarium provided by Dr.

Earl Segal of Cal State Northridge's biology dept. The *Turritella* were found to be detrital (debris on the ocean bottom) feeders, nocturnally active, unable to tolerate warm (75°F) waters but able to withstand wide ranges of salinity. Most of this information is at odds with the life histories published in scientific journals, pointing up a problem with our knowledge of marine animals. Most studies published before the popular use of scuba (the late '60s on) were either on shallow water animals (which transfer to an aquarium well) or animals that had been dredged from depth. No one had been able to go down and look at the animals in their habitats. Biological science can no longer accept the study of a few captive specimens as representing the true behavior of an animal and its relation to its environment. This is as true underwater as it is on land. The advent of scuba has made this possible, but even as more scientists expand their fieldwork into the marine world they cannot do it alone. There is not enough time in anyone's life, much less a research project's budget to search the world's oceans. The accurate and complete logbook of the sport diver may represent the greatest advance in the marine biology of the past as well as the present. 🐠

TRAVEL SLIDE SHOW AVAILABLE

Peter Hughes' Dive Operations now has a new slide-sound presentation available. The program features underwater scenes by several photographers, including frequent SKIN DIVER Magazine contributors Stephen Frink and Rick Frehsee. It was produced at three locations in the Caribbean: in Roatan at Anthony's Key Resort, in Grand Cayman at Spanish Cove and South Cove, and in Bonaire at Dive Bonaire/Flamingo Beach Hotel. The presentation compares and contrasts diving and facilities at these three popular dive vacation destinations. 🐠

AQUA ADVENTURES BROCHURES

Aqua Adventures, the scuba tour operator, has just released its new spring/summer dive vacation brochures featuring the Bahamas and the Caribbean.

In the Bahamas, three and seven night packages are offered at six different properties throughout the islands.

The new Caribbean brochure offers a series of dive vacation plans at resorts in the Caymans, Bonaire, Jamaica, Cozumel, Florida Keys, Roatan and the U.S. Virgin Islands. Package rates include accommodations and diving. 🐠

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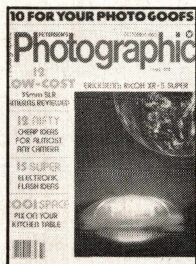
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MIGHTY



Mention the mighty Missouri and the average person imagines steaming riverboats and Lewis and his sidekick Clark poling their keelboats upstream. The Missouri of today is no longer the romantic haven of riverboat gamblers and hard-bitten explorers, but represents a whole new world to a different type of explorer—the underwater kind.

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Full wetsuit, hood, gloves and dive flag are in order; optional equipment is the bricklayer's hammer carried by several local divers and used for digging out the elusive buffalo skull or holding one's position in the current. Masks and fins on, regulators in place and adrenalin pumping, divers move down the rock face of the tailrace, head-first into the mighty

MO RIVER DRIFT



Missouri. The current is strong near the surface, but decreases near the bottom and becomes a comfortable propellant. Swimming cross-current to the left brings the diver mid-river for a leisurely drift along the bottom, 30 feet deep at its lowest point. A curved forefinger and thumb sketch the OK sign and partners begin to concentrate on the changing scene they are inexorably drawn past.

When the powerhouse is fully operational the current rushes divers along, lifting them up and over obstructions just as it appears they will be smashed against unyielding rock, eddies flattening and fluttering the vegetation. When the powerhouse is still, however, the current is milder and merely jaunting rather than racing downstream. Fish abound: burbot, the only species of freshwater cod, lounge and shovelhead sturgeon search the bottom for food as the divers hesitate in order to hand-catch a few. The three foot sturgeon are rather prickly, but possible to hold with gloves, but the slippery burbot must be pinned to the bottom with both hands. Snakelike, the burbot squirts through a diver's hands like a wet bar of soap and escapes. Crawdads and catfish are less obvious—the crawdads lurk near rocky areas where hiding is easy and catfish lie in protected pockets and can easily be caught by hand. (The catfish seem to think they are well hidden if their head is under a rock.) Although not a legal method of taking fish, it represents a challenge to catch and release these easy going creatures of the Missouri—and they don't appear to resent it.

Walleyed pike are less obvious denizens of the Missouri, as they swim upstream near the river's edges. On a rare occasion, pallid and lake sturgeon or paddlefish are seen by sharp-eyed divers. They are shy fish that can grow to over 100 pounds and to over five feet in

(Continued on Page 100)

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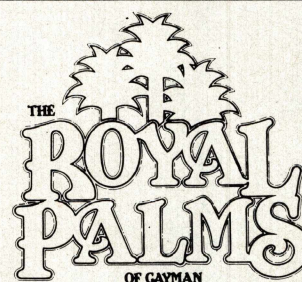
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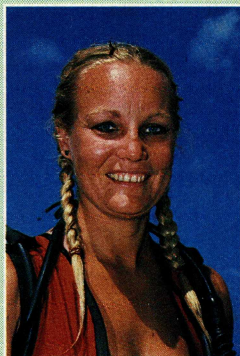


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Bob Soto's Scuba Centre



Top: A scuba class in the Scuba Centre's quiet cove. Above: Dive students become familiar with their regulators on the wooden walkway. Left: Excellent coral reefs lie just offshore the Bob Soto's Scuba Centre.



TEXT AND PHOTOGRAPHY BY GERI MURPHY

For more than 26 years Bob Soto's Diving has been synonymous with Cayman resort diving. Its seven dive boats have carried over 100,000 divers to the reefs and drop-offs which lie offshore. And, if you were to calculate the total mileage accrued by these hard working vessels, it would probably add up to a complete trip around the world!

Not content to rest on its laurels of good diving and reliable boat service, Bob Soto's Diving has recently set course in a new direction. A complete shore diving facility has been built, adding a new dimension to the overall service. Bob Soto's has gone into the shore diving business in a big way. Nestled in a quiet cove at the edge of George Town is a new complex which contains a fashionable scuba boutique, an ultra-convenient shore diving facility and a complete training center for over 20 different diving education programs.

The origins of the Scuba Centre date back more than 20 years when Bob Soto, founder of the company, first dreamed of building a scuba school on Grand Cayman. This quiet and gentle man was both a pioneer and visionary. He recognized the need for such a facility to handle the influx of non-diving tourists who were just beginning to discover Cayman.

Ron Kipp, current owner and president of Bob Soto's Diving Ltd., arrived at the same conclusion in early 1983. His meteoric success with the Guaranteed Dive Vacation brought thousands of new scuba divers and their families to the island. A consumer study of these arrivees indicated a strong desire for additional shore diving to supplement the daily Soto boat trips. Divers visiting Cayman found the boat diving so easy and convenient they had enough energy and time to participate in additional shore dives.

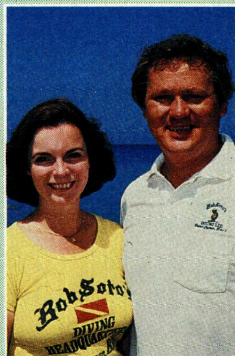
By mid 1983, the Bob Soto's Diving management set to work on the development of a multi-purpose facility that could best serve their customers. Ron Kipp surveyed at least four locations in his search for a waterfront facility close to town and with easy access to clear water and healthy coral reefs. This was not an easy task because Cayman beachfront property is about as scarce and as expensive as a Beverly Hills lot on Rodeo Drive. Kipp was fortunate to secure a lease and the necessary building permits to construct a full facility some 50 yards south of the Lobster Pot, home of the original Soto's Dive Shop. The facility was constructed at a cost of \$100,000.

FACILITY

The heart of Soto's Scuba Centre is a small, cozy, 1,000 square foot building set close to the road. It is wood panelled, both inside and out and extremely well decorated. The interior is divided into three basic sections which represent the three functions of the facility.

The front room is a 400 square foot Scuba Boutique designed and maintained by Georgia Dolack, retail sales manager. This showroom is stocked with just about every imaginable goodie or accessory for scuba diving including; silicone masks, BCs, T-shirts, diving instruments, net bags, underwater lights and dozens of other items. The person you are most likely to see behind the counter on a daily basis is June Pelland, a charming and knowledgeable diver who has been with the company for five years.

To the right of the Boutique is the Equipment Rental Locker which is fully stocked with professional scuba diving equipment including: silicone masks and snorkels; Planas fins; Scubapro Stabilizing Jackets; and Sher-



Left: Divers move through a shallow passage in the ironshore reef off the Scuba Centre. **Above, left:** Manager Pat Scharr-Mavec. **Above right:** Ron and Kathie Kipp, owners of the Soto operation.

wood regulators. The Scuba Centre staff dispenses this equipment to guests on the shore entry patio through a giant counter-window. The exterior of the building is bordered on two sides by some 3,000 square feet of patio wood decking and walkways along the ironshore. Entry into the water is from the shore entry patio at a place nicknamed Seven Foot Beach. Two additional shore entry points are being developed. The Centre is open from 8:00 am to 5:00 pm daily and visitors can make a shore dive any time during these hours. The cost of a shore dive (tank and weightbelt rental) is under \$10, a real bargain, considering the high quality of diving available. Night diving is also available from sunset to mid-evening. (Rental dive lights are available.)

The third and final segment of the Centre consists of a 400 square foot classroom, equipped with sound/slide audio/

visual equipment. This is used for evening lectures and advanced training courses. Just outside the classroom door is a 900 square foot patio deck, used as an outdoor classroom for introductory and basic open water scuba training. The outdoor classroom is shaded by grape-nut trees and palms, and cooled by ocean breezes. Nearby is an ironshore tidal pool filled with creatures for convenient marine life identification.

The scuba students utilize the same shore diving deck for suiting up and entering the water. The Soto management has added a few nice touches such as benches in shallow water which allow students to sit down at a waist deep level and practice the simple scuba skills of mask clearing, regulator purging and fin strap adjustment. Between dives or classes students and guests can enjoy a light lunch or simple snack. Picnic tables

have been placed on the Scuba Centre property with a lovely view of the cove and open sea. Guests can obtain breakfast, lunch or dinner at the adjacent Burger King on one side (south) or Lobster Pot on the other side (north).

CORAL REEF ATTRACTIONS

The Scuba Centre's greatest advantage is that it is in a quiet, protected cove where the ocean is eternally calm. This cove is surrounded on three sides by ironshore and there is less wave action here than in most swimming pools.

Two excellent coral reefs lie directly in front of the Scuba Centre property and there is also 500 feet of ironshore reef which drops off to a depth of 12 feet along the shoreline. The abundance of fish life and macro creatures found in this



Left: Divers suit up before entering the water from the shore entry patio deck. Below, left: The Bob Soto's Diving Ltd. Scuba Centre. Below, right: The Scuba Boutique. The Boutique is one of three separate sections in the Scuba Centre building, including the Equipment Rental Locker and classroom.



area is absolutely amazing. It offers the ideal open water classroom environment for introducing new divers to the joys of sport diving. It is also a gold mine of critters and fish for the macro underwater photography buff.

Soto's scuba instructors and underwater guides have already developed two separate and distinct underwater trails for the Scuba Centre. The Beginner Trail follows the entire perimeter of the ironshore and then doubles back over the shallow coral reef. Diving depths range from 5 to 15 feet and the reef is inhabited by a wide selection of juvenile reef fish and small creatures. Everything seems to be in miniature. There are all types of hard corals, three different types of sea urchins, lovely featherdusters, two types of sea anemones and Christmas tree worms in every color. Fish activity includes: sergeant majors, damselfish, baby squirrelfish, needlefish, trumpetfish, butterflies and parrotfish. Peacock flounders and small stingrays are often seen in the sand patch areas. Guests will see schools of flashing silversides hugging the ironshore reef.

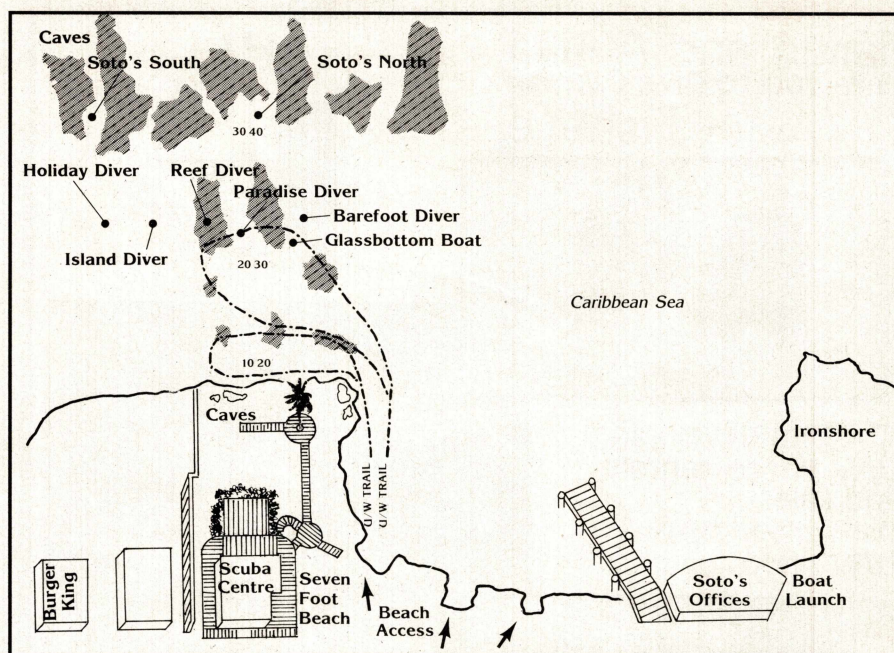
The other trail is the Advanced Underwater Trail which leads straight out to Soto's Reef, a giant coral structure 150 to 500 feet offshore. Diving depths in this area range from 20 to 40 feet and there are actually three separate dive sites charted for this massive reef. The area is composed of giant coral formations which rise up from the flat sand bottom. The reef structure is honeycombed with coral caves, grottoes, tunnels and caverns. It is a marvelous area for exploration and underwater photography. The fish on this reef are larger and include: blue tangs, yellowtail snappers, rock beauties and creole wrasses. Underwater visibility averages 100 feet and can reach a maximum of 150 feet on a really good day.

The quality of diving on Soto's Reef is comparable to many shallow Cayman reefs which are dived by boat. In fact, Soto's Reef has been used as a boat diving site for many years.

TRAINING PROGRAMS

Perhaps the most exciting aspect of the Scuba Centre is the impressive array of diver education programs which are being offered for people at all levels of scuba proficiency. A total of 20 different classes and courses have been developed and scheduled by Patricia Scharr-Mavec, manager of training. Pat is a multi-certified instructor (PADI/NAUI/YMCA) with more than 10 years' experience as a professional scuba instructor and former manager of a Chicago based diving school. She is presently on the NAUI board of directors and is nationally recognized for her development of innovative teaching programs.

The first level of training is a series of



The map above shows the two underwater trails offshore the Bob Soto's Scuba Centre in relation to the shore facilities, caves, entries, ironshore and reef sections.

introductory scuba classes for cruise ship visitors and non-diver guests staying at various Cayman hotels. Cruise ships which utilize the Soto Diving Programs include: the *Mardi Gras*, *Veendam*, *Sun Viking*, *Song of Norway* and *Fairwind*. These classes are known as the Entry Scuba Experience (ESE). Students fill out a brief medical history and are acquainted with the very basics of scuba equipment handling and coral reef environment—all in less than one-half day and with a minimal financial investment.

The next level of training is full open water scuba training courses for certification as a basic diver, basic open water diver or open water upgrade. All certification training is done in the ocean with no use of swimming pools.

The next level of training is a refresher scuba class for certified divers who have not been diving for a year or longer. This is a full day program consisting of one shore dive and one boat dive. Participants are guided through a program of scuba equipment trouble-shooting, salt-water buoyancy analysis, review of basic diving skills and an update on personal diving techniques. The end result is a "born again diver" who feels safe and confident in making boat dives and wall dives for the remainder of his/her stay on Grand Cayman.

There is also a special scuba certification program for experienced divers who are proficient in their diving skills but have never possessed a certification card. Applicants must show some proof (such as a logbook) of previous diving experience, plus take a written exam and

make two open water dives. This program is ideally suited for military divers and scientific divers who have never had the time or opportunity to obtain a national certification card. The Scuba Centre will be conducting a series of PADI/NAUI specialty certification courses, night, wreck and deep diver. For example, the night diver course is scheduled weekly and consists of three dives over a two day period plus pre-dive lectures. There is a pre-night dive from shore and then a night dive that covers the same coral reef area. This introductory experience is followed by a boat night dive the next evening. A YMCA rescue diver (SLAM) course is also scheduled.

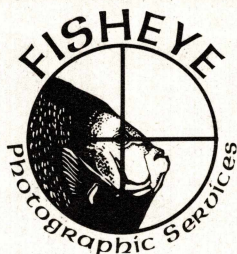
The really fun classes for certified divers are a series of Soto specialty courses in coral, fish and critter identification and 110 snapshot underwater photography. These half-day training experiences are low cost and help greatly to orient the visiting diver to the Cayman coral reef environment. A quickie class in fish identification can make the rest of the week's vacation a far more enjoyable experience.

The next higher level of training is a series of full certification courses in PADI Advanced Open Water and NAUI Open Water II. These are full week training programs with all the bells and whistles. Periodically, courses will be scheduled in the professional categories of assistant scuba instructor, divemaster and dive guide.

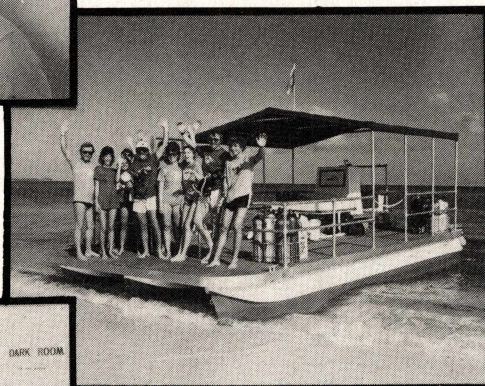
For more information about training courses available at Soto's Scuba Centre or dive boat trips, write: Bob Soto's Diving Ltd., P.O. Box 1801, Grand Cayman, B.W.I.

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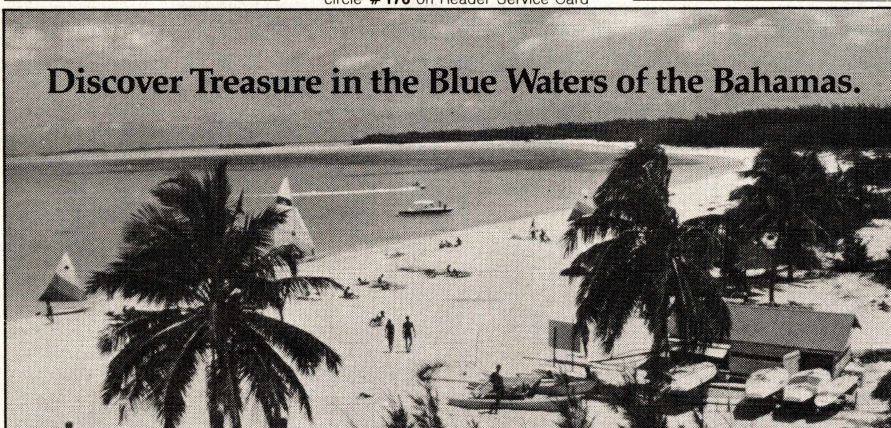
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MISSOURI DRIFT

(Continued from Page 95)

length. What a thrill and shock to share the Missouri bottom with a fish as big as a human! The pallid sturgeon and lake sturgeon are protected fish, plankton-eaters and are quite scarce.

As the divers drift, the bottom changes. Algae and moss that bend with the current's eddies give way to sand and a gravelly bottom that changes to larger rocks further downstream. Buffalo skulls and bones and the bones of elk and other prairie animals lie where they have recently washed out of the river bottom. (The homes of many locals are decorated in early buffalo skull—a sort of skeletal rustic.) Their location—the bottom of a relatively new riverbed—leads to speculation as to why they are there. Did the buffalo drown in what must have been an enormous flood plain? Was it a sort of elephant's graveyard for buffalo? If not, how did so many skulls in varying levels of deterioration happen to be covered with mud and thus preserved? The best specimens are dug out of the mud from only a vague impression spotted on the bottom—a moss-covered horn or protruding jaw. Those the river discovers are tumbled in the current and the skull quickly crumbles leaving only the horns.

Speculation about the age of the skulls is enhanced by the presence of fossil imprints embedded in the sandstone and shale fragments littering the river bottom.

The river bed occasionally dips, creating a quiet pocket where a diver can get out of the current, look around, adjust gear or communicate with a dive buddy and compare finds. Each pass down the river is unique and thrilling. A complete absorption in the present moment suspends time and erases the mundane and mediocre. It is exciting never knowing what will be found during *this* dive.

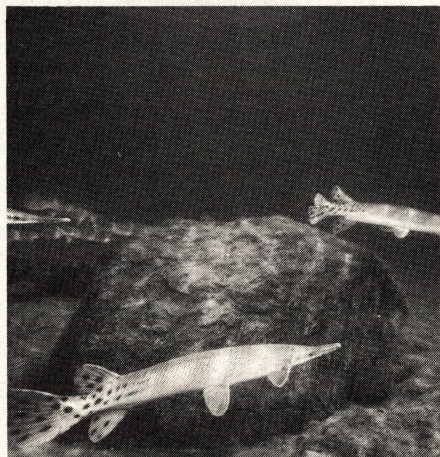
It is amazing to discover the kinds of things that people lose in a body of water. Boaters lose everything from lures to full tackle boxes, outboard motors, six packs of beer or soft drinks and all kinds of anchors. Divers have their own brand of ill luck. Kevin Manson, a former local diver, holds the dubious record of losing the most separate pieces of dive gear during his three year Missouri diving career. On one memorable dive, he lost both his watch and his light. (Both were recovered, as is most gear lost in the tailrace area—but not by the original owner.) It is especially frustrating to lose a piece of gear and then be carried away down the river because it is almost impossible to retrace the route of a particular dive except by accident. The unlucky diver must trust to chance to bring a finder to the right place at the right time. The typical finder's fee is a six pack of a favorite beverage and a slight ribbing. Several miles

downstream, the Highway 14 bridge yields interesting and even exciting underwater finds. Bicycles, evidently stolen and discarded, are not an exceptional discovery. One exhilarating find was a cash register—until it was opened above water and found empty except for a large quantity of Missouri River sand. Several hand guns have been recovered and turned in to local officials. One was implicated in a murder 100 miles away.

While the diver waits in a currentless pocket, several walleyed pike may swim by on their way upstream. They hesitate,



photos/Merlyn Hillmoe



swim on, then return for another look, all fins extended in battle formation, ready to whisk away at the slightest hint of danger. They will advance to within three feet if not startled, perfect range for the spearfishing season or photography buffs.

Spearfishing of game fish is allowed during July and August below the Highway 14 bridge at Pierre and most of the year above the Oahe dam, where walleyes can easily be found around bay edges and promontories. One weekend per year permission is granted for the South Dakota Spearfishing Contest in the entire diveable river. K. Thomas and Donna Bowers, proprietors of Skin and Scuba-Oahe, sponsor the tournament and contest registration entitles participants to free air fills, a mouth watering barbecue, trophies, prizes and a time to socialize with other river rats.

As the divers continue downstream, they begin to check compasses occa-

(Continued on Page 107)

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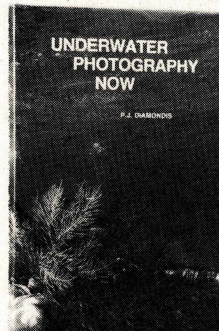
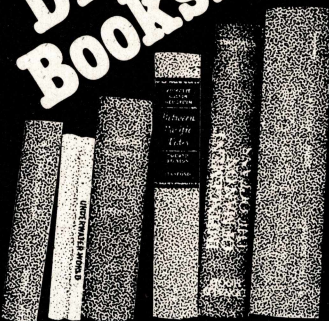
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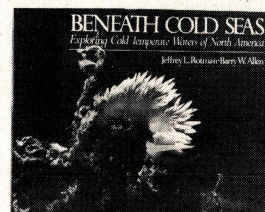
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Divers Bookshelf



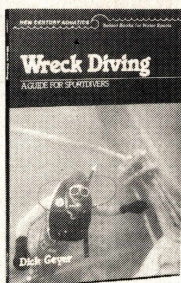
1 Underwater Photography Now— Written by P.J. Diamondis this book defines the basic principles and physical laws governing U/W photography in terms the beginner can understand. Diagrams and example photos are included. \$14.95. P.J. Diamondis, 255 Redwood Rd., Merritt Is., FL 32952.



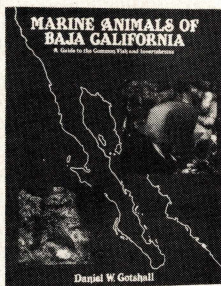
2 Beneath Cold Seas—With text by Barry W. Allen this book features the photos of Jeffrey L. Rotman in large color plates. Marine life from the colder waters of both the Pacific and Atlantic coasts of North America is featured. \$30.50. Van Nostrand Reinhold Co. Inc., 135 W. 50th St., New York, NY 10020.



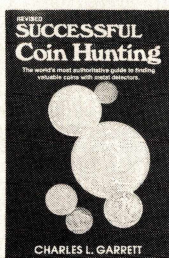
3 Snorkeling...Here's How—By Robert H. French, Jr., this manual is filled with color photos illustrating proper snorkeling techniques. Subjects range from equipment to water pressure effects to the buddy system and other skills. \$5.95. Sport Divers Mfg., 1923 N.E. 150 Street, Miami, FL 33181



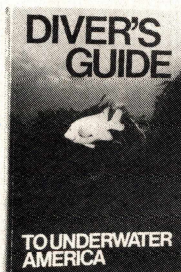
4 Wreck Diving—Written for sport divers by Dick Geyer, this book covers topics including: equipment, wreck hunting techniques, hazards, site conservation and boat terminology. Illustrations and color photographs. \$8.95. New Century Pub. Inc., 275 Old New Brunswick Rd., Piscataway, NJ 08854.



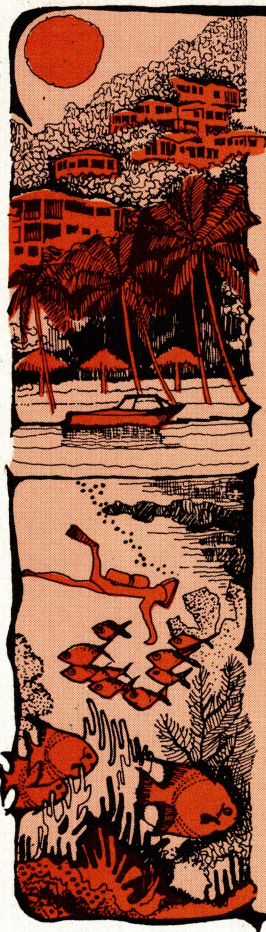
5 Marine Animals of Baja California—By Daniel W. Gotshall this guide describes 125 species of fish and 62 species of invertebrates found in the shallow waters of Baja California. Color photos of each species with biological notes. \$17.95. Sea Challengers, 1851 Don Ave., Los Osos, CA 93402.



6 Successful Coin Hunting—By treasure hunting expert Charles L. Garrett, this book covers such topics as: where to search, tools necessary, coin cleaning and metal detectors. Diagrams and photos of successful coin hunters in action. \$6.95. Ram Pub., Dept. SC13, P.O. Drawer 38649, Dallas, TX 75238.



7 Diver's Guide to Underwater America—By Kate Kelley and John Shobe, this book describes the major dive sites in each state in the U.S. States are grouped in categories such as Pacific Northwest, Gulf states, Appalachians, etc. \$14.95. Divesports Pub., SR 2 Box 390, Branson, MO 65616.



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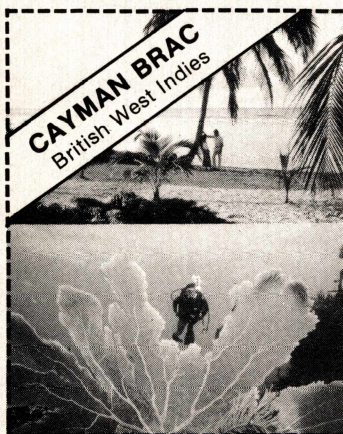
California coastal mornings are often cool and foggy in September and the seventh day of the month in 1940 was no exception. Aboard the *Olympic II*, permanently moored to a reef three miles out of San Pedro, it was business as usual. The business of this 258 foot barge, owned by the Hermosa Beach Amusement Company, was fishing. This activity was totally disrupted when the *Sakito Maru* suddenly and unexpectedly materialized out of the fog, ramming the *Olympic* amidships. Gravely damaged, the *Olympic* remained afloat as long as the Japanese freighter's bow was entangled in her midsection. Not realizing the severity of the impact, however, the *Sakito's* captain reversed his engines and pulled his ship away. This left a huge hole in the *Olympic* which filled rapidly with water. The boat sank in 100 feet of water, taking four passengers and three crew members with her.

This was the dramatic final chapter in the long and colorful life of the once square-rigged bark. Built in Belfast, Ireland in 1877 by Harland and Wolff, she was a stately three masted, iron hulled ship originally known as the *Star of France*. Her owner was J.P. Cory. As one of Cory's five "Irish Stars," she sailed between England and India involved in the jute trade. (Jute is a plant fiber used for burlap and twine.)

In 1898, the *Star of France* was sold to J.J. Moore of Hawaii. In 1905, she was purchased by Alaska Packers and, with two of her sister ships, fitted with unique portholes, the brass storm covers of which carried the Alaska Packers flag. Those who wish to see what she looked like in those days can visit her sister ship, the *Star of India*, at the Embarcadero area of San Diego Harbor. Part of the San Diego Maritime Museum, the *India* still has her Alaska Packers portholes.

In 1934, Captain J.M. Anderson bought the *France*. Her masts were cut to the first cross-trees and she became a fishing barge renamed the *Olympic II*. Six years later, after 63 years of sea duty, she was rammed by the *Sakito* and sank.

For more than two decades, the *Olympic* lay forgotten on the ocean floor. Fishermen found her to be a productive area, but memories faded as to exactly what was attracting so much marine life. Then, in 1962, Rusty Shields of the Commercial



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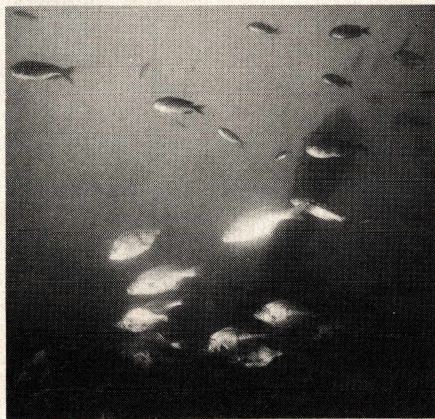
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Diving Center buoyed the spot and sent two divers down to verify that this was indeed a shipwreck. One of the divers was George Edwards, the other was high school student Roy Hauser, then a deck-hand on the *Rio Rita*. (He and Glen Fritzler now own the *Truth* and *Conception* dive boats in Santa Barbara, CA.) After diving on the *Olympic*, they began



asking old timers about the site and uncovered the ship's history and identity. After recovering large amounts of chain from the wreck, they began running dive charters to her. Divers descended upon her, gradually removing her portholes, bell, wheel and binnacle cover. In 1972, the California Wreck Divers salvaged her capstan, which was donated to the Los Angeles Maritime Museum. (It is not on exhibit as yet but will be in the future.)

The *Olympic* has been interred in her watery grave for more than 43 years. Her remains are covered with marine growth, the colors of which become apparent on-



photos/Bonnie J. Cardone

ly under the beam of a strobe or dive light. There are strawberry anemones (*Corynactis californicus*) in red, pink and orange; featherduster worms (*Eudistylia polymorpha*) in white, gold and lavender; scallops (*Hinnites giganteus*) with mantles of orange and black and eye spots of blue and yellow. Nudibranchs are common among the *Corynactis*. On the deeper parts of the ship the large white anemones, *Metridium senile*, can be found. Fish are always abundant.

Since the *Olympic* lies in the shipping lanes just outside Los Angeles Harbor, the water is usually murky. Good visibility is considered to be 20 to 30 feet. She is

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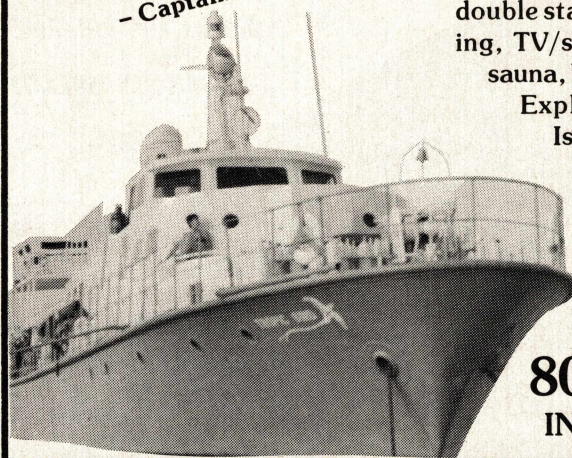


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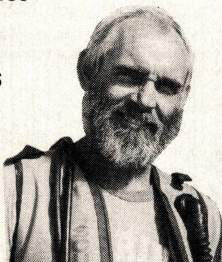
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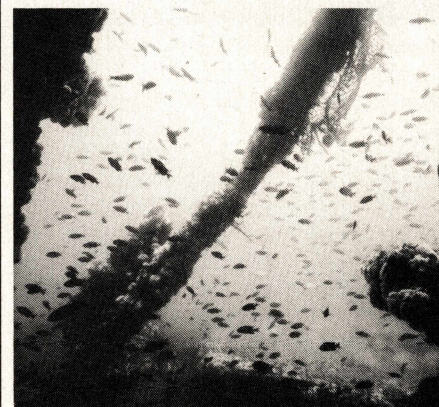
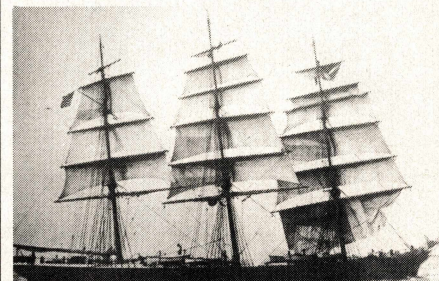
ABACO

Eastern



OLYMPIC II

a deep wreck: The tops of what is left of
her ribs are 70 feet from the surface; the
sand around her is at 100 feet. Divers
should descend and ascend along an an-
chor line, not only because the water is
dirty and it is easy to get disoriented, but



also because of all the boat traffic around
her. Because she is fished regularly, she
has monofilament line and nets hung up
on her. There is often a thermocline at
about 40 feet and the water below that
depth is cold. Currents are common.

Dives on the *Olympic* are for experi-
enced divers only because of the condi-
tions mentioned above. But, those who
brave the elements to visit her are well re-
warded. There is wonderful macro life for
the photographer; game for the hunter;
and artifacts for the wreck diver. China
and other items are yet to be found in and
around her. One diver recently found a
kerosene lamp in the sand, its glass
chimney still intact. Another found a
brass fire hose nozzle with part of the rot-
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Star of France, the *Olympic II* is a star at-
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MISSOURI DRIFT

(Continued from Page 101)

sionally, angling closer to the western shore in order to leave the Missouri River at Diver's Point. This jetty cuts across the river and causes a venturi effect, compressing the water through a relatively small opening. Divers avoid being carried through the area by the current, since barely submerged rocks are a very real danger. Instead, the divers drift gently into the shallows and exit the river to sounds of, "What did you find this time?"

This drift dive is only one of a variety of dive plans possible, depending on the preference of the divers. The tailrace or below the Highway 14 bridge, are optimal sites for buffalo skulls or manmade finds; spearfishing is available in the reservoir above Oahe dam or below the Highway 14 bridge. A deeper dive can be made to the intakes for the stilling basin, on the west side of the reservoir, just above the dam. The intakes, which are for emergency use only, are 150 foot tall structures with tops in 75-80 feet of water. Any of these dives can be made with or without the assistance of a boat.

Wreck diving and artifact diving can also be found in the reservoir. The Tri-County Rescue Squad planted a wreck several years ago for emergency rescue practice. The old tugboat is an interesting dive and a popular site for photographers. Ten miles upstream the old Fort Sully and Indian village are popular among amateur historians and archaeologists, having been abandoned by the professionals.

Night diving is always exhilarating and is an excellent opportunity for the freshwater photographer, as fish are attracted to the dive lights. Visibility remains quite good all summer owing to the 200 foot depth of the reservoir although the depth also contributes to chilly water. Visibility is especially good during the months of January, February and March, when the reservoir is frozen. Ice diving is also popular during the winter months, especially among those hardy souls with drysuits.

Skin and Scuba-Oahe offers a complete line of scuba equipment, rentals, maintenance and repair—seven days a week, Memorial Day to Labor Day and six days weekly the rest of the year. Local divers can frequently be found "bench diving" at Skin and Scuba and are nearly always available and willing to dive with those newly certified or unfamiliar with the area.

The Pierre-Ft. Pierre area caters to the fishing population, so there are marinas, both public and private, below the dam and in the reservoir. There are also excellent accommodations at the many motels, resorts and campgrounds near and on the river.

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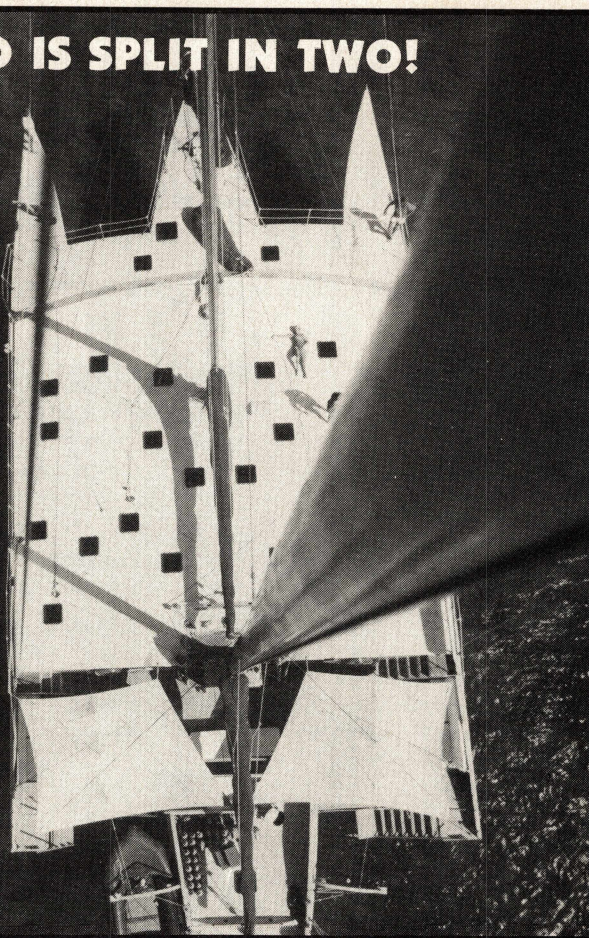
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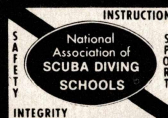
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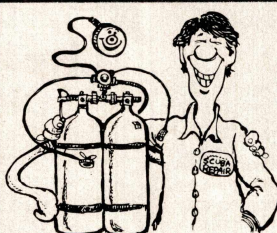
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DIVER ETIQUETTE

Members of the North Shore Frogmen's Club of Peabody, Massachusetts have been receiving a large number of complaints from town/city residents and law enforcement officers in the North Shore area of the state. These complaints include: thoughtlessness regarding private property; ignoring non-diver rights; obstructing driveways; obstructing traffic while unloading gear; nudity—when changing after a dive; ignorance of local diving and beach restrictions; ignorance of diving regulations; ignorance of requirements regarding the taking of lobsters, crabs, and fish.

As a general rule the individuals involved are not affiliated with dive clubs/organizations. These latter normally police themselves.

Obviously, many of the problems cited are peculiar to Massachusetts. However, it is likely many similar problems exist in other states—especially those bordering the ocean.

The club is requesting that all instructors include a presentation on diver etiquette and rules and regulations within the basic scuba course. Divers are already fighting enough federally-proposed restrictive legislation—they certainly don't need the added task and aggravation of fighting the states, cities and towns as well.

SCUBA DISTRIBUTOR OF THE YEAR

Selpac Southeast Corporation, Norcross, Georgia has been named the 1983 Scuba Distributor of the Year by Sherwood Selpac Corporation, Lockport, New York. The award was presented by Fran Skop, vice president-marketing of Sherwood Selpac and accepted by Peter Skop, Selpac Southeast president.

The firm represents Sherwood scuba products in Alabama, Arkansas, Florida, Georgia, Kentucky and Louisiana. Other states include Mississippi, N. Carolina, Oklahoma, S. Carolina, Tennessee, Texas and W. Virginia. Selpac Southeast also covers South America and the Caribbean area.

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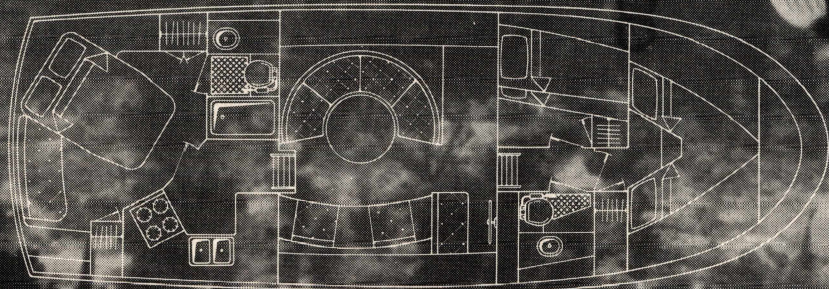
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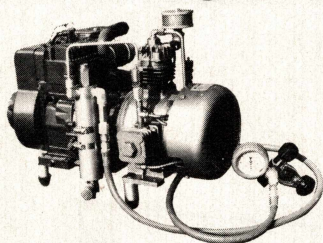
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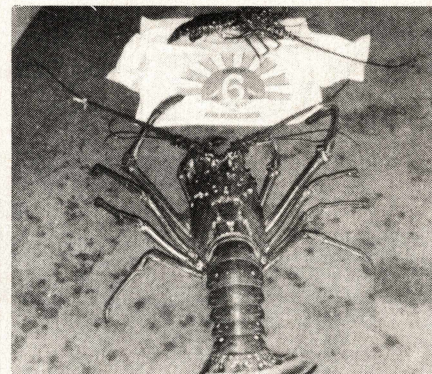
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DEEP SIX LOBSTER CONTEST

Deep Six Dive Shop, Inc. is having its Sixth Annual Live Lobster Contest Friday, July 20 through Saturday, August 4. There will be thousands of dollars worth of prizes given away to the divers who catch the ten heaviest lobsters. There will also be daily prizes for the largest lobster brought in by the 6:00 pm deadline.



There is no entry fee, but you must be registered 48 hours prior to the weigh-in of your first lobster. The first place winner in 1983 weighed 11½ pounds; the tenth place winner, 6 pounds.

For information contact Live Lobster Contest, Deep Six Dive Shop, 1550 Old Dixie Hwy., Vero Beach, FL 32960.

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Diver and marine historian Jim Jenney has created the first computerized data bank for information concerning all shipwrecks lost in American waters. He has authored *In Search of Shipwrecks*, *Shipwrecks of New England*, *Diver's Directory of Shipwreck Research*, *Advanced Wreck Diver's Manual* and several other books and numerous articles relating to diving and shipwrecks. He has spent more than 15 years as an active marine historian. To date, he has collected data on more than 20,000 shipwreck sites (mostly along the Eastern Seaboard) and has computer data files for more than 7,000 lost vessels.

For further information on the operation of the data bank please address all inquiries to: J.F. Jenney, Marine Historian, P.O. Box 144, Saunderstown, Rhode Island 02874.

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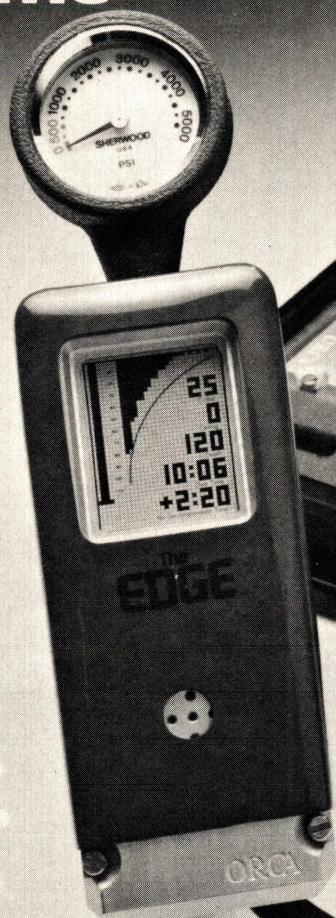
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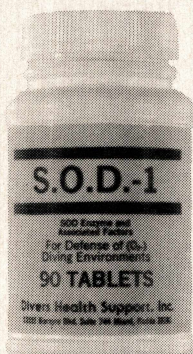
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AQUA-WOMEN

To further sport diving on Long Island and increase participation by all segments of the diving population, the Long Island Divers Association will sponsor its 4th annual Expedition Aqua-Women, a deep water dive by 25 female divers.

On Sunday August 5, this year's Expedition Aqua-Women will sail from the Oak Beach Inn, Oak Beach, Long Island aboard the 55 foot dive boat *Deep Adventure* captained by John Larsen. The destination will be the 13,000 ton World War I heavy cruiser U.S.S. *San Diego*, sunk by enemy fire nine miles off the Long Island coast.

For information on this event contact: Edith Hoffman, P.O. Box 7304, Hicksville, NY 11801. 📞

BIG LOBSTER

Harvey Leonard of Harvey's Diving Center, Brooklyn, NY recently caught a 23 pound lobster on the Fire Island Light shipwreck off the New York coast. Leon-



ard was diving from the *Aquarian*. The huge crustacean provided dinner for six people, two nights in a row. 📞

U/W PRODUCTION CO.

A new underwater production company, Cine Aqua Services, has formed. The company can handle all underwater production needs. Mike Brock's three associates in the company are Ronnie Rondell, Stunts Unlimited, 2nd unit director and stunt coordinator; Al Gornick, underwater cinematographer, whose credits include *History of the World, Part 1*, *Gray Lady Down*, *Raise the Titanic*, *The Black Stallion* and *The Right Stuff*; and Greg Barnett, actor and stuntman, currently doubling for Robert Wagner on television's *Hart to Hart*. Mike and his associates are members of DGA, IATSE, SAG and AFTRA.

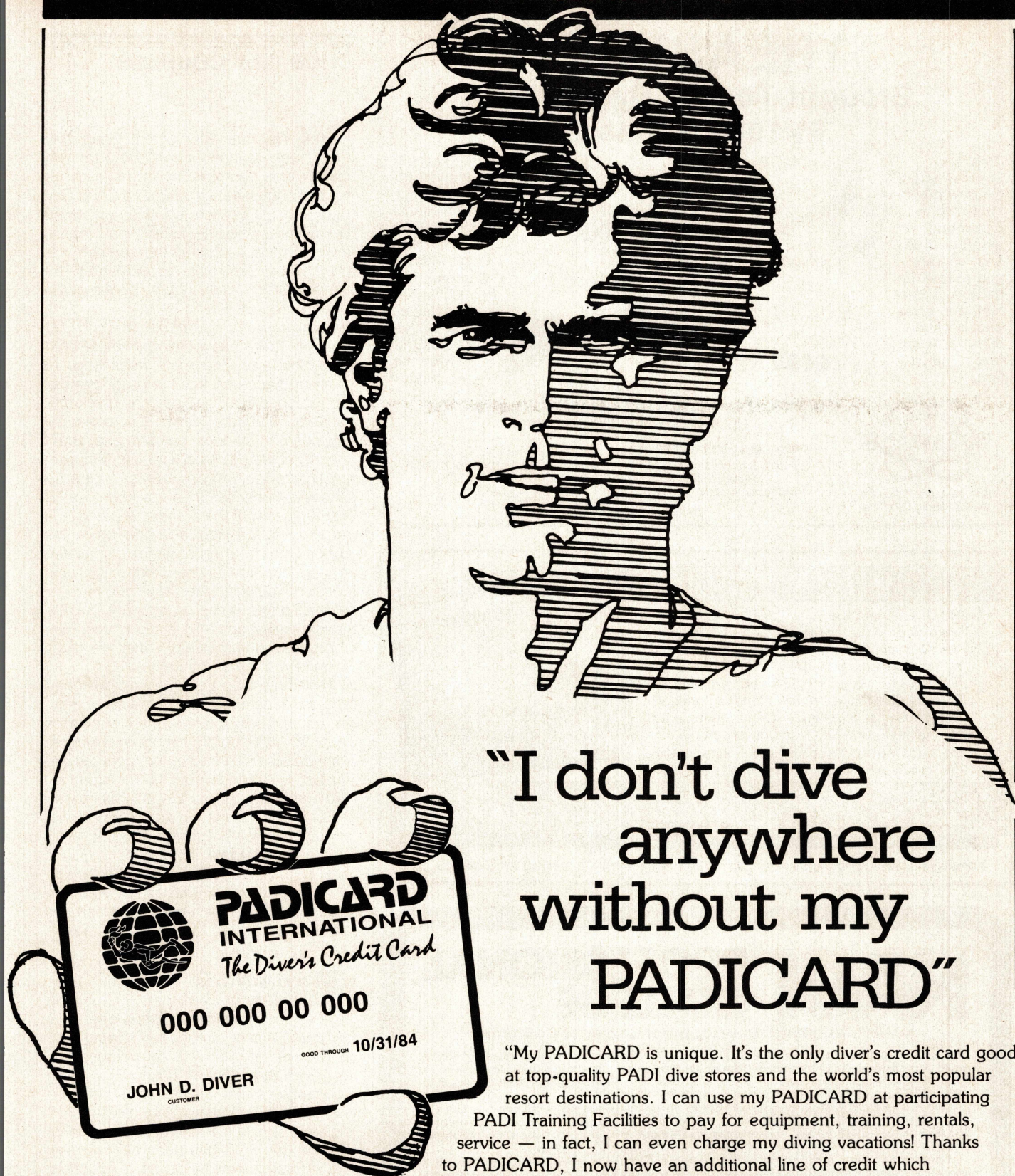
For further information write Cine Aqua Services, 4200 Camino Real, Los Angeles, CA 90065. 📞

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CHUB CAY COURSES

Dick Yax, manager of the Chub Cay Club, recently announced plans for two underwater photography courses to be held in August of this year. The Chub Cay Club is a full service island resort which specializes in game fishing and scuba diving activities. It is in the southern region of the Berry Islands, Bahamas, on the edge of the well known Tongue of the Ocean drop-off.

The programs offered by the Chub Cay Club are known as the Underwater Photo Magic courses. These are week long, intensified hands-on training programs designed specifically for beginning photographers. Students learn how to handle and load a Nikonos camera and shoot macro, close-up, flash and fish pictures.

All strobes, macro tubes, close-up lenses and accessories are loaned as a standard part of the course. Students are required to provide only the basic Nikonos camera or rent one for a small fee for the duration of the course. Classes consist of daily lectures and slide presentations, photo dives, equipment maintenance workshops and film critiques. Film is processed immediately after the dives and viewed the same day.

The Photo Magic courses are designed and conducted by Paul Tzimoulis, a master underwater photographer, with more than 25 years of teaching experience. Scheduled dates for the two courses are August 4-11 and August 11-18. Island arrivals and departures are on Saturdays.

For more information and reservations, contact: AT Reef Ventures, 280 S.W. 34th St., Ft. Lauderdale, FL 33315. U.S. toll free (800) 327-7333; Florida and Canada call (305) 524-0106. Interested divers are urged to make their reservations early as classes are limited to 16 students.

JIM TRAINING

The College of Oceaneering is offering a new course designed to train operators for the JIM one atmosphere diving suit. Jim Joiner, president of the college, stated, "The Atmospheric Diving Suit (ADS) concept was first introduced by our parent company, Oceaneering International, Inc., in 1974. In the ten years since its inception, the ADS has been accepted by the industry worldwide as a practical means of performing underwater work at depths beyond the range of today's commercial diver.

"JIM is a pressure vessel which allows a man/woman to operate articulated arms and legs that enable him/her to walk and work at depths down to 3,000 feet for a length of time limited only by workload, and surfacing directly without having to undergo decompression. Students in this class will truly be training for tomorrow's technology, today."

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New Canon Sure Shot w/case, (Housing available)	\$ 138.00	Yashica Autofocus S, w/case	\$ 89.50
Olympus XA	\$ 116.50	Ricoh FF3AF	\$ 149.00

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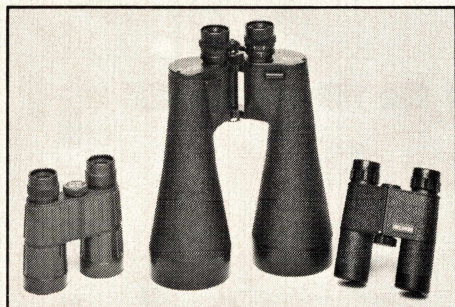
There's a Nikon system for you. With features that include multimode automatic/manual exposures, bright viewfinders with LED indicator and super-fast shutter speeds. Helix offers a wide range of these top-of-the-line cameras, at truly affordable prices.

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Nikon Cameras

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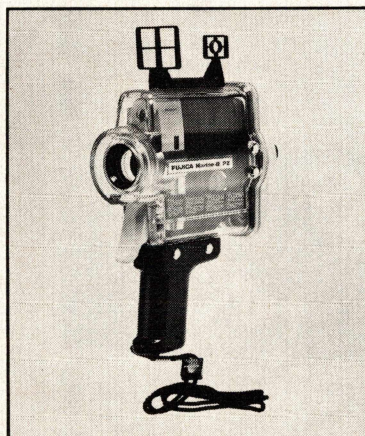
Helinon 8x40 rubber coated binoculars w/case extra rugged and water resistant; ideal for boat use \$ 89.00

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Dive right in...

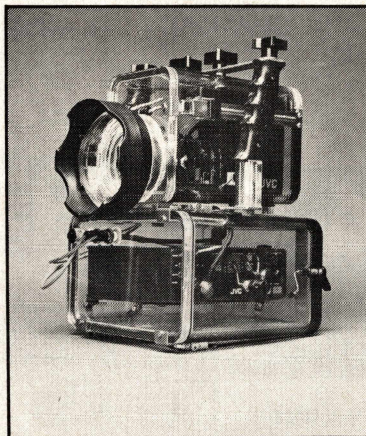
Catch all of the action with an underwater movie or video system. For the amateur, there's the inexpensive Fujica P2 movie kit. While the JVC system offers all the high-quality results pro's expect.



Left: Fujica P2 Underwater Movie Kit

This kit features the Fujica P2 Single-8 movie camera, a removable underwater housing that protects to 120', a sportsfinder and a pistol grip. Also includes a cartridge of Fujichrome R25 film and processing.

Fujica P2 Underwater Movie Kit \$ 99.00



Right: JVC Video System w/Ikelite housing

This complete JVC system includes a JVC video camera that features a Saticon pick-up tube, electronic viewfinder, f1.2 6-power zoom lens with macro setting, auto iris with manual override and microphone. Also comes with a super-compact VCR that uses new high grade 1/2" video tapes.

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TREASURE COINS

(Continued from Page 35)

cence (the separation of oxygen from hydrogen in the liquid) occurs which releases the bonding of many compounds from the silver (or copper) of the coin. A commercial electroplating unit is used with the object to be cleaned connected to the negative terminal and the stainless steel plate connected to the positive terminal. The stainless steel plate and the coin are immersed in the electrolytic solution (I use sodium carbonate in distilled water) and heated to 180°F. **Warning:** Many commercial electro-cleaning solutions contain cyanide and produce cyanide gas. Use only in an extremely well ventilated area. The electroplating unit is turned on and the current is adjusted to 10-12 amps and about 5-7 volts (larger units carry heavier amperage). **Never** allow the coin and the steel plate to come in contact with the unit on. High amperage is dangerous and should be used with extreme caution.

"Acids are used to clean metals by dissolving the corrosive chemical compounds. It is important to know what your discovered item is made of because some acids will completely dissolve one

type of metal while being completely inert to another. For example: A 95 percent solution of sulfuric acid which has been heated will effectively remove copper oxides and verdigris from silver without harming the silver coin; it will destroy a copper coin. Concentrated aqua regia, when used cold, will completely dissolve gold, but will only affect the surface of silver. I have found various sequences of acetic, hydrochloric, sulfuric and nitric acids to be effective in removing corrosive elements. If you do use acid baths to clean coins: 1) Always use Pyrex containers; 2) Always thoroughly rinse the coins in a saturated solution of baking soda in water followed by a thorough rinse in water before drying or transferring to another solution; 3) Always wear rubber gloves and an apron; 4) Always have a clean solution of baking soda in water on hand as a wash in case of eye or skin contact, and 5) **Warning, danger:** Do not inhale any fumes from acids, use only in an extremely well ventilated area. **Always** add acid to water **never** water to acid.

"There are other chemical solutions which I use besides acids. All of these should be treated with the same care and precautions as acids. A solution of ammonia (33 percent) removes silver chloride and verdigris without harming silver. Sodium hydroxide (caustic soda) removes verdigris and silver sulfide. **Warning, danger:** This is extremely corrosive,

have a wash of vinegar in water on hand at all times in case of skin or eye contact."

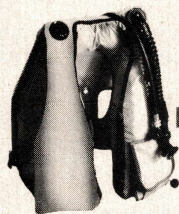


A gold religious pendant with ivory statuette from the 1715 Plate Fleet Wreck that has been disassembled for restoration.

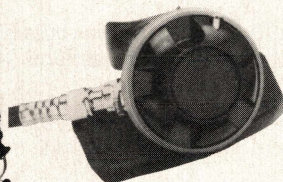
These are professional methods that do work to clean coins, but they are dangerous and Aiken suggests that only experts should do the work, unless you have a fairly comprehensive knowledge of chemistry. A jeweler or craftsman with



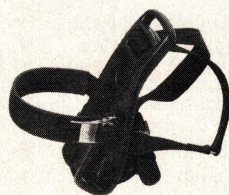
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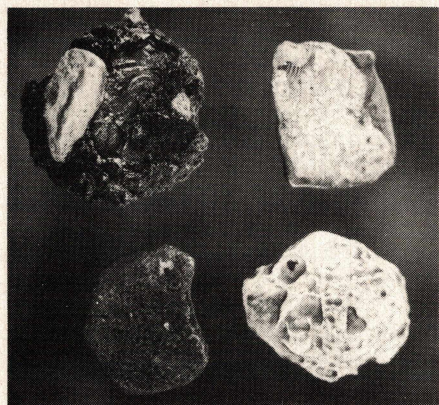
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a plating operation should be able to do the job.

If you do find a treasure coin while diving, some simple household methods are often successful in partially reducing the verdigris to a level where the coin can be



This photo shows the corrosive effects of saltwater immersion on silver. Top left: 8 reale coin covered with verdigris. Top right: Coral on a 4 reale coin. Bottom left: Silver sulfide on a "Oreo cookie" coin. Bottom right: Cleaned 4 reale coin.



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more easily identified. One method is the sustained immersion of the coin in a chemical cleaner like Top Job. After a while you can carefully flake off the corrosive layers with a dull knife. Another method involves immersion in common ammonia. Boiling the coin in vinegar (which is three to five percent acid) is an alternative to working with concentrated acids. Aiken says that these methods won't work for everything but they won't harm the coin.

Aiken goes on to say, "After cleaning your coins of all chemical corrosion you may wish to polish your find to an approximation of its original finish. Use black rouge on a six inch stitched wool polishing wheel spinning at 3,450 rpm; for a shiny, jewelry-type finish use red rouge on a cotton muslin wheel." This method won't remove any metal he says.

About the only book available on the cleaning and restoration process is *Cleaning and Preservation of Coins and Medals*, published by Sanford J. Durst, New York 1976. This volume is comprehensive but not light reading. For more information on electro-cleaning refer to either *Electroplating and Related Processes* by J.B. Mohler or the electroplating booklet published by the William Dixon Company, 750 Washington Ave., Carlsbad, New Jersey.

After cleaning your find you may decide to display it on your bookshelf or, if

it is a coin or jewelry, proudly wear it. Every time that you hold or look at your treasure you will feel yourself connected to those adventurers who sailed the Spanish main centuries ago. With many treasure wrecks still to be located, sport divers and beachcombers will be finding coins and artifacts for years to come. Happy hunting and good luck! 

PAVELKA/SHERWOOD WEST

Ron Pavelka has been appointed scuba products manager for Sherwood West. In his new capacity Pavelka will represent Sherwood scuba regulators, valves and related products in 11 Western states and all countries bordering the Pacific basin.

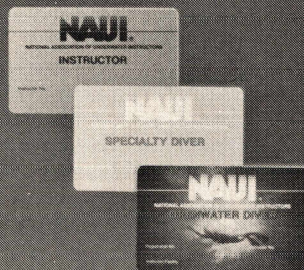
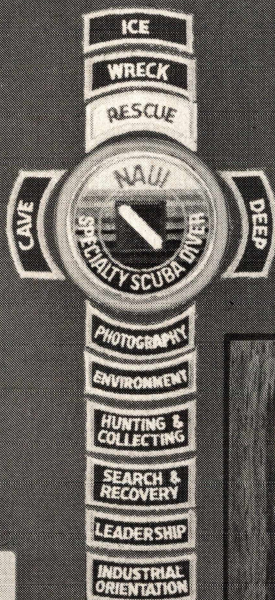
Pavelka was formerly a vice president of JBL Enterprises, Inc., Orange, California. He currently is active as a scuba instructor with PADI and NAUI. 

GRIFFIN EXHIBITION

Underwater photography by Nick Griffin will be showcased from Monday, June 4 through Saturday, June 30 at the World Trade Center in Baltimore, 401 E. Pratt Street, Mondays through Fridays from 8:00 am to 6:00 pm.

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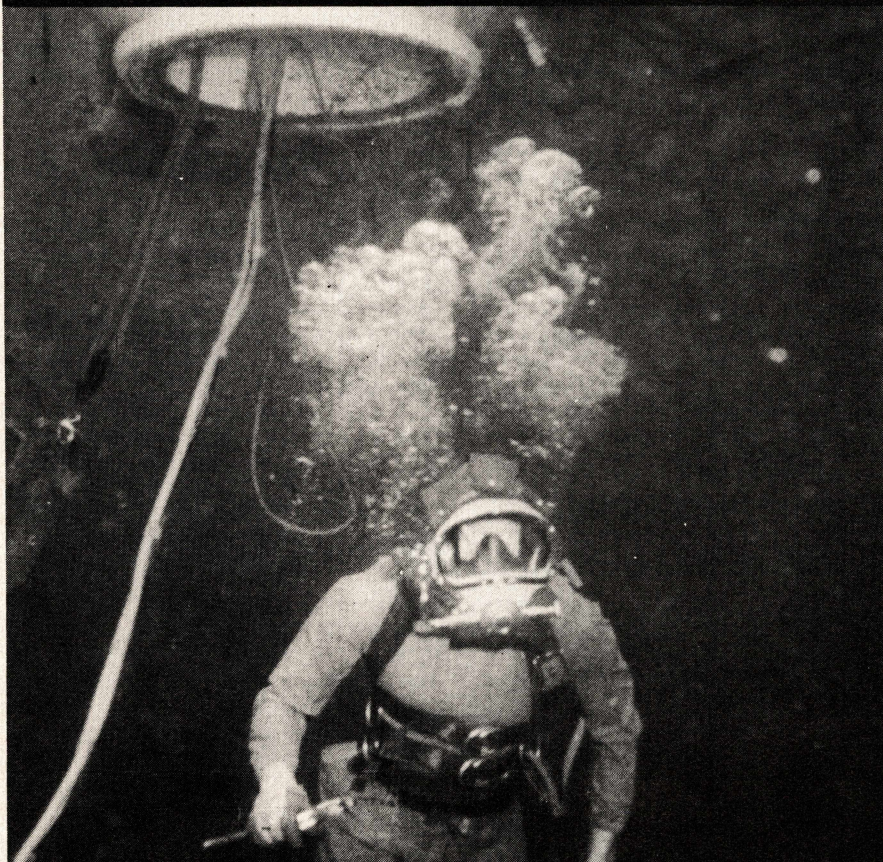
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AUTOMATIC STROBES

(Continued from Page 37)

cate electronically; recycle and confidence lights and other exposure displays are usually shown in the viewfinder. When mixing dedicated equipment of different manufacturers, read instructions carefully to verify that it is compatible.

USING AUTOMATIC STOPS

Let's assume that you are using ISO 64 film, and that f8 is your strobe's only automatic aperture for that particular film speed. Underwater, as long as you work within the automatic range of the strobe, and as long as sunlight doesn't require a higher numbered f stop for a proper exposure, you should have no problems.

Now, let's assume that a bright sunlight scene requires an f11 exposure, but your automatic aperture is f8. Because sunlight has overpowered your strobe and requires a smaller aperture than your automatic control, your picture will be one stop overexposed if you use the f8 aperture. This can easily happen at camera-to-subject distances of about three feet or more in clear, shallow water, especially with upward camera angles.

Therefore, in bright conditions, begin with a meter reading off your subject to determine the sunlight aperture. Compare the sunlight aperture with the automatic aperture, and set the lens for the highest numbered aperture of the two. What is the benefit of the automatic strobe if you are actually using a form of manual exposure control? The automatic feature prevents the strobe from overexposing your subject, even if you accidentally hold it too close.

Having a choice of several automatic stops allows you to balance strobe exposures more closely with the sunlight exposures. You must, however, set both the sensor and aperture for the desired f stop. The basic procedure is to use an exposure meter to determine the sunlight aperture and then to set both the sensor and aperture for an f stop equal to, or higher than, the metered stop.

Whenever the automatic aperture used is smaller (higher numbered) than the metered aperture, near subjects will be brightly illuminated and backgrounds will be dark. Whenever the automatic aperture is the same or wider (lower numbered) than the metered aperture, pictures will have a natural look with strobe fill lighting on the near subject areas.

STROBE FILL WITH AUTOMATIC

As an example assume that your strobe has a choice of three automatic apertures—f3.5, f5.6 and f8. Your exposure meter reading for the desired sun-

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light exposure is f8, so you set the lens for this. To reduce the strobe output so it will be one stop less than the sunlight exposure, simply set the remote sensor for f5.6. Because the sensor "thinks" that the aperture is wider than it really is, it will reduce the strobe's output.

THE PHOTOGRAPHER AT WORK

Suppose that you wish to shoot a photographer at work with her strobe flashing. Your subject in this example is using an automatic strobe with a slave mode. (The flash of light from your strobe will trigger her slave.) To tighten the composition of your picture, your subject will be holding her strobe very close to her subject—so close that it could cause an overexposure in your picture. Therefore, set the sensor of her slave strobe for an aperture that is one or two stops wider than the aperture you are using to take the picture. Her automatic strobe will then produce a low power flash that won't overexpose or cause flare in your picture.

BRACKETING WITH AUTOMATIC

This section applies only when you are close to your subject and the strobe determines the exposure. It will be easier to understand if you will think in terms of black and white images. An automatic exposure control is designed for subjects of average brightness. Not white, not black, but an average shade of gray. If the sensor reads the light reflecting off a white subject, it signals the strobe for an exposure that will darken the white subject to gray in your picture. Likewise, if the sensor reads light reflecting from a black subject, it signals for an exposure that lightens the black subject to an average gray.

Therefore, if you are photographing a light subject that fills the sensor's field of view, you may need to set for more exposure to prevent your subject being darkened. To do this with a remote sensor system, open the lens a partial or full stop wider than specified. Likewise, when photographing a dark subject, bracket by using a smaller aperture so the automatic doesn't lighten your subject. This is, of course, just the opposite of how you would bracket with manual control!

With a TTL system, bracket by decreasing the film speed setting when photographing light subjects and increasing it when photographing dark subjects. You may need to take test exposures to learn when to bracket.

CONCLUSIONS

With average subjects that fill the sensing area of the sensor, automatic strobes will give consistently good exposures. But, for subtle lighting techniques—such as a touch of backlighting through frilly, translucent tentacles or soft side lighting—manual control is hard to beat.

If a sensor sees only the center of a wide angle picture area, it could com-

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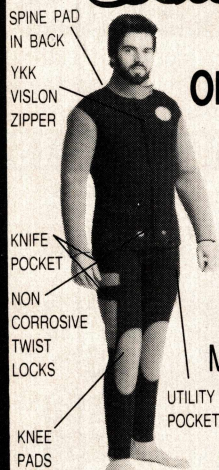
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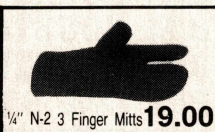
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AUTOMATIC STROBES

pletely miss a near subject that isn't centered in your viewfinder. Thus, the sensor could respond only to the distant background and signal the strobe for a full power flash that overexposes the near subject or foreground. Even if a sensor sees the entire picture area, the light reflecting back from a small subject on a darker, lighter or midwater background may not be interpreted correctly.

At this writing, non-TTL automatic strobes aren't truly suitable for close-ups in the automatic mode. They don't allow the small apertures (such as f16 and 22) with slow film speeds (such as ISO 25 and 64) that are best for close-ups.

If a remote sensor and related cords can't be removed when you use manual exposure control for close-ups, they clutter up the system. You may wish to remove as many bars, brackets, sensors and cords as possible so you can get your camera into tight places. Reliability is another consideration: The greater the number of cords, wires and connections, the greater the probability of a failing.

Automatic exposure controls don't make every decision for you. You still need a working knowledge of film speeds and f stops, and will often need to be able to meter the sunlight exposure.

R/V BEACON EXPEDITION

The Research Vessel *Beacon* recently arrived at George Town, Grand Cayman, BWI, carrying a cargo of cannons, artifacts and two injured Honduran lobster divers. Three large, muzzle loading cannons and a smaller carronade had been raised from the remains of HMS *Thunderer*, which went down in a hurricane in 1780, without trace or survivors. Also recovered were well preserved examples of hull fittings, ammunition and a massive bronze rudder pintle, which had served to attach the man-of-war's enormous wooden rudder to the vessel's hull.

The expedition was cut short in order to carry the two Honduran divers suffering from the bends into George Town. The divers had been gathering lobsters for a Caymanian fishing vessel when they were stricken.

The crew of the *Beacon* was much the same as during the first voyage of discovery which occurred last December. The vessel was commanded by Captain Herbert Humphreys, president of Marine Archaeological Research Ltd. (MAR) and owner of the Holiday Inn, Grand Cayman. His chief assistant and partner is MAR's vice-president, chief engineer, Ken Jackson, a Caymanian residing in West Bay. Captain Thomas Henning served as ship's navigator and captain Bob Soto lead the underwater recovery team. Also present was marine archaeologist, Daniel Koski-Karell.

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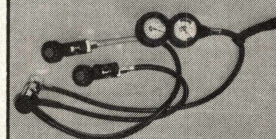


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In Auckland the company employs about 50 people, with wetsuit (scuba, waterski, surfing and boardsailing suits) sales comprising about two-thirds of the business. Some 750 patterns are used at present. There have been about 60,000 suits produced over the years.

But, the story really begins in 1954 with Alf Dickenson, the man behind Moray In-



dustries. Being greatly interested in the sea, he was thoroughly fascinated by Jacques Cousteau's *Silent World*. Alf decided he had "to get into this game" and before long had joined the Auckland Underwater Club. Soon, he was making regulators. The first time he scuba dived, Dickenson used one of Les Subritzky's homemade regulators—and, of course, in those days the only bottles available were surplus oxygen tanks.

Keith Coubray, Dickenson's partner in a small engineering business, was a wizard in design—he made up a new diaphragm and regulator case. This regulator worked well and, along with their own make of cylinder valves, was marketed as the Atlas Freeflow—an alarming name to give a regulator today!

Dickenson and Coubray's company, Auckland Automotive Engineering Ltd. of Union Street, Auckland, also made a speargun. Registered as the Moray, this, along with the regulator, was marketed by the Atlas Trading Company.

Dickenson, however, saw no future in manufacturing spearguns and regulators (with the high cost of tooling up and in the face of overseas competition) so he looked to wetsuits.

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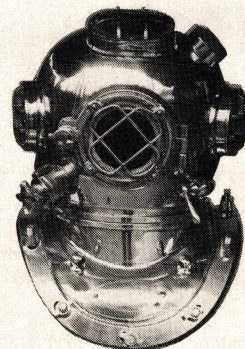
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very rapidly. Thus, the Moray wetsuit was born. It used locally formulated glue and was custom-made.

Then came a difficult time: There was a shortage of imported rubber sheet. "One guy," Dickenson recalls, "waited 15 months for his suit but in the meantime lost a lot of weight—so we had to make it over again."

At this time most of the suits were still being made up without zippers. Then the Japanese bronze alloy zippers became available. By 1968 the company was sewing Moray suits fulltime in its 900 square foot factory. Two years later the company moved to Devonport—to a new name, Moray Industries Ltd., and to a new 4,500 square foot factory with a staff of six.

Alf Dickenson sold out his shares in the old engineering business and bought out Keith Coubray's share of the Underwater Centre of the engineering company. The new company stopped dealing with the diver directly and hired a salesman.

The 1972 move to import Dacor equipment was followed by John Hempstalk's becoming Dickenson's partner the following year and the beginning of exports to Australia. Hempstalk was to move to Sydney a few years later to establish Moray Industries Pty. Ltd. to market the New Zealand made wetsuits.

Today the neoprene suits are sold in Singapore, Fiji, Rarotonga, Tahiti, Australia, Great Britain, New Zealand, and the U.S. The now familiar diamond Moray patterned suit has lately been Japanese made. But over the years neoprenes have been made up to Moray's specifications by manufacturers in the United States and Britain as well.

Alf Dickenson still puts in a full day's work with much business traveling (four months overseas last year) but now is looking to spend a bit more time sailing and golfing. With his wife Audrey, herself a diver and a former Auckland Underwater Club ladies spearfishing champion, Dickenson looks back at "a whole life of work. Everywhere I go," he reflects, "I see my products. It gives me a great deal of satisfaction to see these being marketed successfully and used with enjoyment by today's divers."

"I was particularly thrilled to be thanked at one of our Australian seminars, by a dealer speaking on behalf of the trade, for producing 'excellent' products that were easy to sell."

With the age of the dive computer upon us, Dickenson can still remember vividly his first few dives—which introduced him to a new business and a new way of life.

Alf Dickenson, while not the spearfishing enthusiast he once was, still enjoys getting his own scallops and crayfish. He enjoys taking his own underwater photographs (with a Pentax in a Paul Morrison-built alloy housing) and loves nothing better than a weekend on his own launch with friends. 

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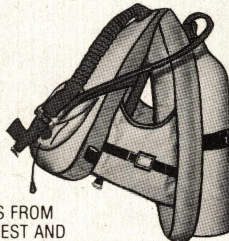
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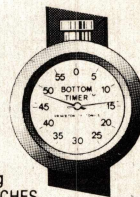
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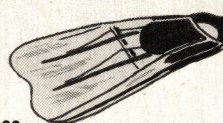
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BASIC CREATURE SEEKER'S GUIDE TO

CARIBBEAN CRITTERS

TEXT AND PHOTOGRAPHY BY
CHRIS AND DONNA MCLAUGHLIN

A fun way to increase the pleasure of diving is finding creatures in the Caribbean to observe and photograph. This is basically simple provided you know where to start.

The first step is to slow down and observe. If you are swimming three feet above the reef at cruising speed you are going to miss a lot of activity. Since the creatures we are looking for are extremely small, you won't find them wandering about on the top of the reef. You will have to look in places where they are likely to be hidden from their predators. Your best aid will be knowledge. Literature on ma-



rine invertebrates is available in book stores, your local dive shop and, in many instances, can be found at diving resorts. Make use of these tools before you enter the water and your success rate will be much higher.

White antennae, colorful bodies and delicate features are all characteristic of cleaner shrimps. These creatures are truly worth seeking out and are fairly common. One of the most sought after is the banded coral shrimp. This red and white striped shrimp is large in comparison to other cleaning shrimps but still rarely reaches five inches in length. To spot them, look for several white antennae (the approximate thickness of fishing line) protruding from the underside of small crevices and overhangs. Once you have found the antennae, follow them beneath the overhang. Though the shrimp is now in sight you won't be able to observe him very closely unless you are carrying a light. If you would like to have a closer look at the shrimp, gently put one hand on each side and slowly bring them together. This results in the shrimp moving into full view.

If you are interested in other cleaner shrimp, look for an anemone. Once you

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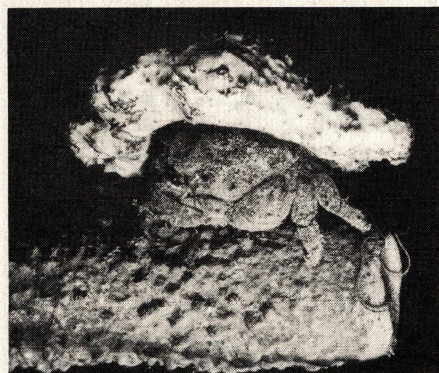
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have found one just look between its tentacles and you are likely to find at least one type of cleaner shrimp. Many anemones host Peterson, pistol, harlequin and spotted cleaner shrimps. However, don't be discouraged if the anemone you just spent five minutes looking for has none. If you continue to keep an eye out



for cleaner shrimp you will eventually find one. Once you do, rest your hand near the anemone and wait. Soon the shrimp will come timidly to your hand and begin to clean it.

Crabs found in the Caribbean range in shape and size; their colors reach all corners of the spectrum. Hermit crabs, for instance, can live in a shell the size of a conch shell or in one the size of a flamingo tongue. Of the crabs in this guide, the hermit crab is likely to be the one you will most often find. They live almost anywhere underwater, though most often they are found in sand, on gorgonians



and in coral cracks. At first sight only the crab's shell will be visible. Once you've spotted a shell, reach for it. If you can pick it up easily you have probably found a hermit crab. If the shell requires more strength to remove, the snail is still in it. To see the crab within, put the shell either on its back or at a slight angle. Now it's time for patience. The crab will eventually come out in an attempt to right itself.

Simple to study, yet hard to find, are decorator crabs, the reef's best hidden creatures. This is because they are often right on top of a sponge or gorgonian. Camouflage is their secret; they actually attach pieces of their surroundings to their bodies to attain maximum protec-

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CREATURE SEEKERS

tion. For example, the decorator arrow-crab who lives on gorgonians and black corals, will affix hydroids and pieces of algae to its body. This makes the crab virtually invisible because the corals in which it lives also collect such particles. When looking for this crab you will have to peer into the branches of black coral and gorgonians very carefully. Look for a clump of debris that is larger than the others and see if it moves when you put your hand near it.

Decorator crabs, as a whole, are easier to find on a night dive. This is especially true of the sponge crab. It ranges in size from one-half inch to 12 inches. The smaller variety usually has several small fragments of sponge on its body while the larger crabs have a solitary piece on their back that resembles a sombrero. Seeing these critters can be very difficult during the day. At night your odds are increased. Sponge crabs don't always wear a sponge identical to the one they are living on, often they will be on a sponge of a different color, but it will have the same shape or pattern as the one they are wearing. With the aid of your dive light the color contrasts are much more obvious.

There is a crab that is often mistaken for a spider. This brown leggy creature is called an arrowcrab and likes to hide among companions that have longer arms or tentacles than its body. For instance, sea urchins and crinoids both have unpleasant arms that protect the arrowcrab from its natural enemies. At the base of these creatures you should find an arrowcrab. If you are careful you can reach down and pick it up. It will walk quite comfortably on your arm, but keep your eye on it as the animal will try to crawl to the underside.

Starfish can be found in a multitude of sizes, shapes and colors. The most common starfish you are likely to find while diving in the Caribbean are brittlestars. To see these look for tube sponges or an area of rubble. Purple tube sponges, which are larger than most varieties, house brittlestars within their tubes. On smaller tube sponges brittlestars tend to live at the base of the cluster. If tube sponges produce no brittlestars for you, the next place to look is underneath debris. Brittlestars are named so because of their fragile limbs, so while searching the rubble be careful lifting and replacing rocks so as not to harm the creatures.

The most unusual starfish is the basketstar. During the day all you will see of this creature is what appears to be a mass of tangles about the size of a fist within a gorgonian. On closer inspection you will see several little arms wrapped around each other with some gorgonian

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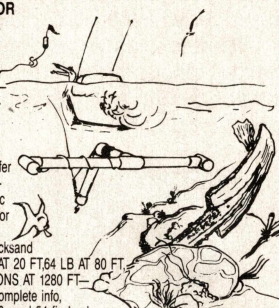
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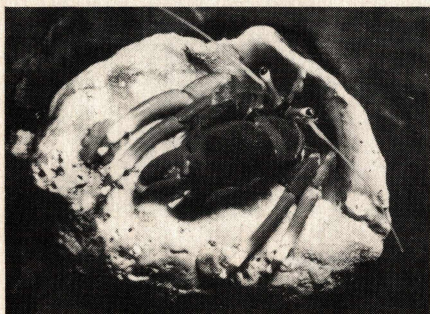
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arms mixed in. At night, however, this small clump of arms turns into a three foot wide starfish. Unlike other starfish, the basketstar's original five arms continue to divide, forming hundreds of arms. You can actually see this creature eat by shining your light at its center.

Though there are many mollusks in the Caribbean only two of them seem to re-

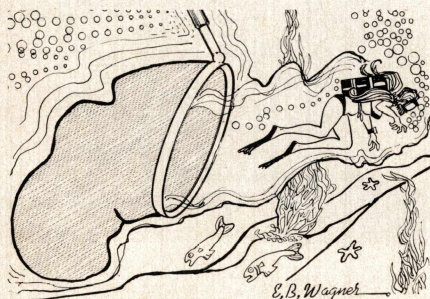


main in one general area. The first is the flamingo tongue. This creature can be found within or at the base of gorgonians and seafans. When you touch the shell the spotted mantle will retract. To get a closer look without disturbing the animal, slightly bend the fan or gorgonian in front of it. This will enable you to see the snail's face. The second mollusk is the ruffle bag nudibranch (letuce slug). It chooses basically anything that is algae covered



(such as dead coral or rocks) for its home. Locating a lettuce slug will depend a lot on luck, for they are not abundant and they blend in well with surroundings.

The most important thought to remember is that small creatures are defenseless when removed from their natural habitats. While observing them you should always be sure to protect them from predators such as groupers, yellowtail snappers and Spanish hogfish. Once your study is complete, return the creatures to their homes.



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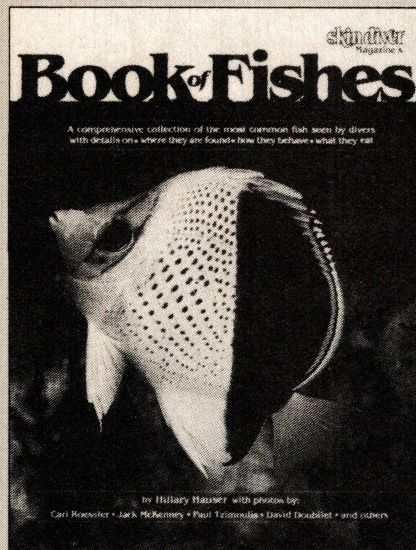
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HUB/HERON ISLAND

(Continued from Page 81)

Throughout the HUB program on Heron Island, doctors were able to discuss with Dr. Edmonds the variety of unique diving opportunities which exist along the 1,200 mile Great Barrier reef, as well as the possible unexpected problems sport divers more familiar with Caribbean diving might encounter.

The Australia trip was the first such diving medicine conference for U.S. physicians of its kind, and the thirty-first HUB session. To date, over 1,300 participants have received their Doctorfish graduate status through Human Underwater Biology courses, either in fundamentals of diving medicine or selected topics.

HUB's first program was held on San Salvador in 1978 and an average of nine sessions are held in a variety of diving destinations each year. All HUB courses are approved by the American Medical Association through the Undersea Medical Education (CME) credits.

For information on future HUB programs write Human Underwater Biology, P.O. Box 5893, San Antonio, TX 78201; (512) 492-9395.

SCUBA SPORTS AWARD

The 1983 Scuba Dealer of the Year Award was presented recently to Scuba Sports by Selpac Southeast, Norcross, Georgia. The award, presented by Peter Skop, president of Selpac Southeast, was received by Lenny Panisch, owner of Scuba Sports, Rob Pansich and Harry Del Campo. The award was given in recognition of outstanding sales and promotion of the Sherwood scuba line throughout the entire Southeastern United States during 1983. This marks the second consecutive year that the company has won the award.

Scuba Sports, which represents a full line of Sherwood valves, regulators and other scuba components, operates outlets in Miami and Plantation, Florida.

BOOK CORRECTION

In the April issue New Books section SDM featured *Diving and Fishing Locations, Boynton Beach to Dania Pier*. The address, however, was incorrect as well as the price: Two books covering the same area were confused. The correct information for these two different books is as follows:

Diving and Fishing Locations, Boynton Beach to Dania Pier: \$7.95, (second edition) from McAllister Marine, 418 NE River Dr., Deerfield Beach, Florida 33441.

Guide to Offshore Reefs and Wrecks, Boynton Beach to Dania: \$6.95, (first edition) from Institute of Marine Science, 1428 SW 12th Avenue, Pompano Beach, Florida 33060.

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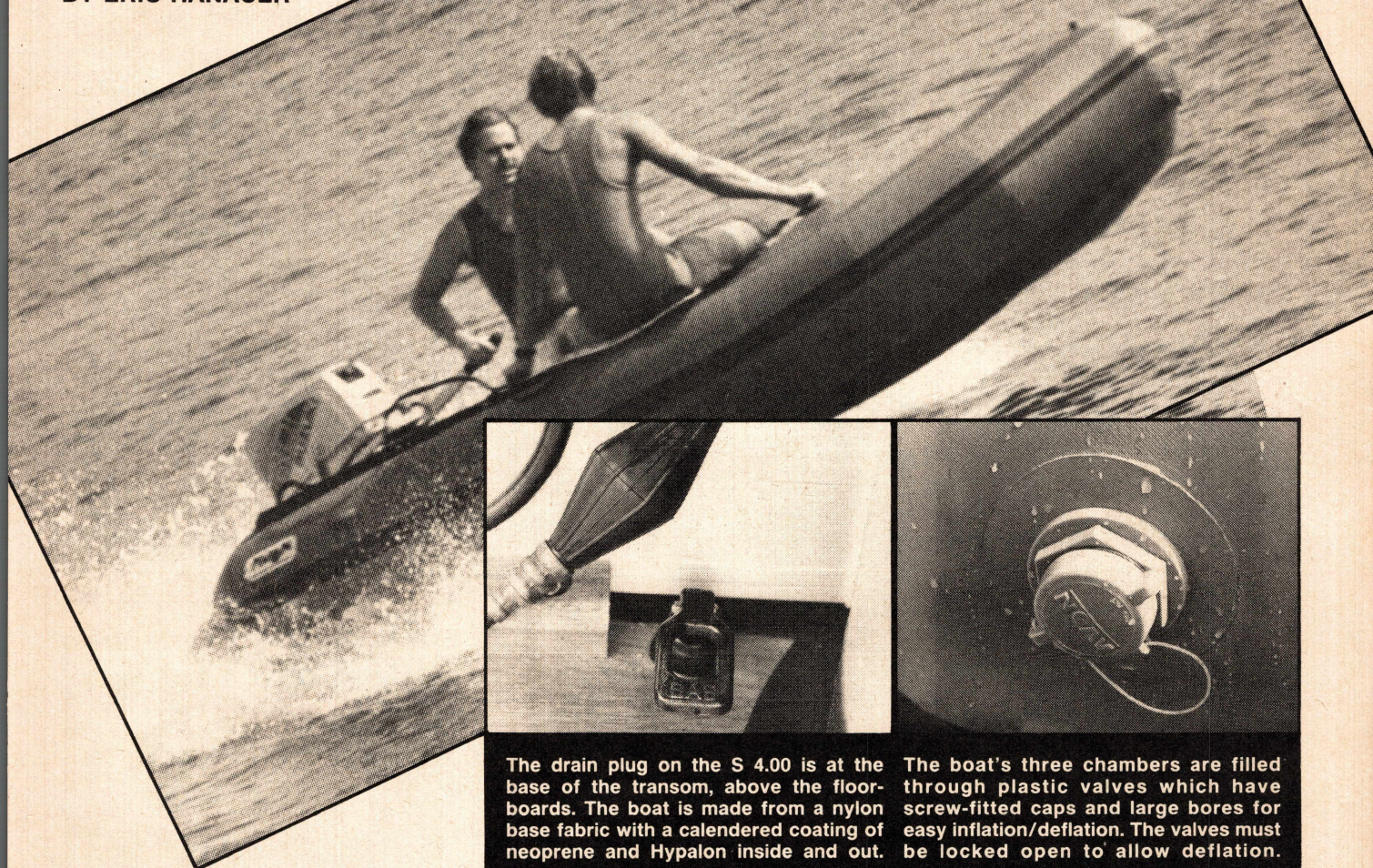
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TEXT AND PHOTOGRAPHY
BY ERIC HANAUER



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In the beginning, there were only two inflatable sportboats considered worthwhile by serious divers and Avon was one of them. Today, there is a plethora of choices available. But, after 24 years, the British boats are still around and going strong. They come in a wide variety of shapes and sizes for all purposes, from riverboats to liferafts, 38 different models in all. At least eight of them are bona fide dive boats, representing three classifications: Rovers, Sportboats and Seariders. Examples of each have been covered in this series.

The Rovers are Avon's utility boats, ranging from 9 to 12.5 feet, with wooden floorboards and inflatable keels. Next

come the sportboats, 11-15 feet long, in standard or Spitfire configuration. The Spitfires come in red, with aluminum floorboards, and cost a little more. Finally, the Seariders have a fiberglass deep-V hull bonded to inflatable tubes. Primarily designed for rescue, they are also suitable for diving. The concept has been so well received that a couple of Rover models have been outfitted with the hull.

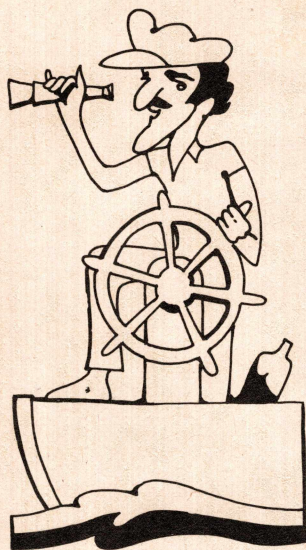
Of all the choices, perhaps the one best suited for most diving purposes is the Sportboat S 4.00. At 13 feet, it is the optimum length for carrying on a cartop and transporting up to four divers. It will do the job with a 25-30 horsepower engine, so it is well within the economic

reach of most divers. Let's look closer.

All Avons are made from a nylon base fabric, with a calendered coating of neoprene and Hypalon. In calendering, the coating is applied with high pressure rollers. Unlike many manufacturers who use weather resistant Hypalon only on the outside, Avon uses the same mixture both inside and out. They claim to use more Hypalon in the mixture than any other manufacturer, but the actual percentage is a factory secret. The boat is assembled with typical British workmanship and attention to detail.

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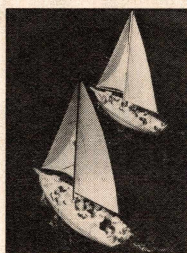
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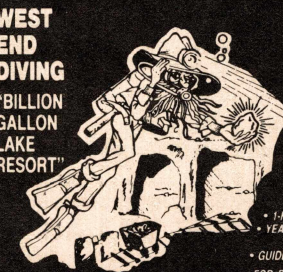
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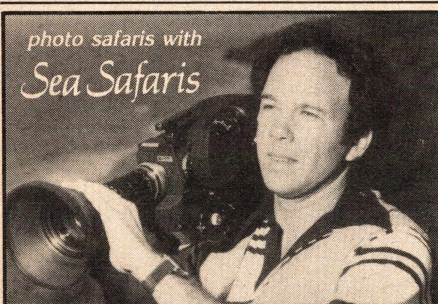


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AVON S 4.00

(Continued from Page 129)

seams are guaranteed for five years from the date of purchase against deteriora-
tion, and all parts and workmanship are covered for a year. The warranty includes commercial application and can even be transferred to a second owner if the boat is sold. Few products of any kind extend the warranty to subsequent owners.

The finished product is a conventional looking sportboat with a fixed bowdodger and an inflatable keel. The anti-hogging strakes, fabric strips atop the pontoons which aid rigidity, were moved inside the tubes a couple of years ago to give the boats a cleaner look. However, consumers preferred the more conventional clutter, so they were put back outside a year later. The red bowdodger is supported by a plastic brace which looks flimsy, but easily held my weight. The tubes taper from a 17 inch diameter at the stern to 15 inches at the bow, resulting in more interior space without sacrificing buoyancy.

Avon sportboats normally come with plywood floorboards, fitted with aluminum lips where they interlock and held in place by aluminum stringers. Our test boat had all aluminum floorboards, a \$155 option. If the owner is partial to red, he or she can opt instead for the Spitfire 4.00, at a price of \$200 more than the standard S 4.00. In addition to the pretty color, that boat has metal floorboards as standard equipment.

The three chambers are filled through plastic valves which seem quite rugged and functional. They have a large bore for fast inflation and deflation and work one way so air won't escape when you finish pumping. To deflate, push and twist the stem, locking the valves open. A screw-fitted cap protects the valves against sand and salt buildup.

Avon's drain plug is a curious anachronism. Lacking a nonreturn valve, it can be opened only when the boat is planing. The opening is also rather high on the transom, making it impossible to drain any water below the level of the floorboards. This is a strange oversight in an otherwise well thought-out boat.

Another thing missing from the S 4.00 is a set of oarlocks, but that constitutes a point in its favor. Oarlocks projecting above the tubes always seem to find a diver's bottom or belly as he or she climbs into the vessel. Besides, no inflatable boat rows very well because of its shallow draft. If the engine conks out, it is no harder to sit on a pontoon and paddle than it is to row. Therefore paddles are available instead of oars and deleting the oarlocks makes sense.

Our test boat was supplied by Port-a-Marine, Costa Mesa, California; a fre-

quent collaborator in this series. We ran it in flat water off Newport Beach, loaded with three passengers, two sets of dive gear and powered by a 30 horsepower Suzuki engine. It went immediately up on a plane, without the slightest hesitation. Thirty horses are more than adequate for diving applications, although the hull is rated for 40. The boat displayed a surprising amount of bounce, considering the smooth water conditions. When turning, the stern seemed to hold at first, then skidded more and more as we continued to apply power. The ride definitely favored sportiness at the price of stability.

Andrew Dosset, of Seagull Marine, the West Coast distributor for Avon, was puzzled by the poor performance of our test boat. When he offered to take me on another ride in the S 4.00 I accepted, and I learned something.

At first, we ran the boat with four and one-half pounds of pressure in the keel and the engine tilted back to the second notch. The boat bounced and skidded just like it had during the SDM test. Then Dosset dropped the pressure to one and one-half psi, moved the engine tilt to the first notch and placed all four passengers toward the stern. It was like a different boat. No longer squirrely, the S 4.00 handled the chop well. It jumped on a plane within ten yards after power was applied.

AVON S 4.00

Length.....	13'
Beam.....	5' 6"
Interior length.....	8' 10"
Interior width.....	2' 8"
Weight.....	171 lbs.
Tube diameter.....	17" tapering to 15
Material.....	nylon/Hypalon/ neoprene
Chambers.....	3 plus keel
Floorboards.....	Wood (aluminum optional)
Payload.....	1,430 lbs.
Capacity.....	6 or 4 divers
Max. hp.....	40 (30 recommended)
Price.....	\$2,995 with aluminum boards

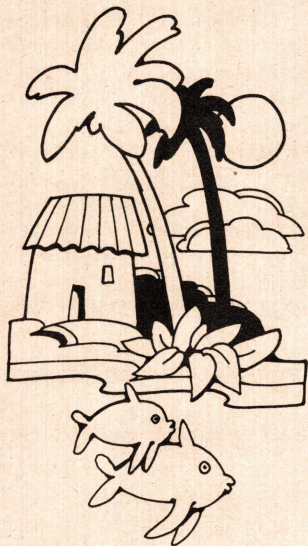
Turning maneuvers were much more controlled, and one could open up the engine with confidence that it would go where it was pointed.

It seems that keel pressure, motor tilt and weight distribution are critical factors. The Avon was designed to run with low pressure in the keel, resulting in a gullwing effect. Air moving between the keel and the pontoons reduces friction and improves performance.

Dosset has compiled a series of hints on proper trim which are available from Avon dealers or from Seagull Marine. Applying them could make a significant difference in the handling of your Avon.

Standard equipment includes the fixed bowdodger, anti-splash vanes, a fitted storage pocket, foot pump, pressure gauge and a maintenance kit. Options of interest to divers would include the aluminum floorboards, launching wheels, windscreen and remote steering.

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KEY LARGO CONDO 3 BR, 1 1/2 bath, compl. furnished. Marina, saunas, tennis, pools. 2 mi. Pennekamp Park. Great diving, fishing, sailing. Special summer rates.	305/582-1940 305/546-2275
KEY LARGO-DIVE FROM OUR DOCK OR PENNEKAMP Write: Great Diving, P.O. Box 161414, Miami, FL 33116 2 BR/2 bath waterfront luxury living from \$10/day per person, 6 persons.	305/255-4556
KEY LARGO LUXURY BAYFRONT CONDO 10045 S.W. 130th Terrace, Miami, FL 33176 2 bedroom, sleeps 6, fully furnished, tennis, pool, dock space, near Pennekamp.	305/665-1055
KEY LARGO LUXURY CONDO Oleinik, 8555 Blue Cut Ln., Cincinnati, OH 45243 Luxuriously decorated, 2 bedroom, dock, pool, sauna, tennis. Minutes from best dive areas.	513/984-0866
KEY LARGO VACATION RENTAL S.D. Lewis, 1808 H Ashborough Way, Marietta, GA 30067 Boat dock, ramp, beach, comfortable A/C accom., kit, all amenities, best diving & fishing areas. \$350/wk.	404/424-9308
KEY SEA CENTER P.O. Box 515, Big Pine Key, FL 33043 MM29.5 Dive Looe Key, custom dive boat, free air w/trips. Rentals, sales, PADI instruction.	305/872-2319
KEY WEST PRO DIVE SHOP 1605 N. Roosevelt Bl., Key West, FL 33040 Instruction, sales, service, charters. Write for information on adventure dives.	305/296-3823
LADY CYANA DIVERS P.O. Box 1157, Islamorada, FL 33036 MM 85.9 Daily reef trips aboard our 40' custom dive boat. Rentals, air, sales, service, instruction, group rates, packages.	305/664-8717
LOOE KEY REEF RESORT & MARINA P.O. Box 509G, Ramrod Key, FL 33042 MM.27 Singles, doubles, tv, pool, jacuzzi, restaurant, ramp, dockage. Compl. dive shop, instr., USCG cert. custom dive boat, grp. rates.	305/872-2215
PENNEKAMP DIVING HEADQUARTERS 99696 Overseas Hwy., Unit 1, Key Largo, FL 33037 Daily reef trips, rmtls., air, sls., instr., repairs, grp. rates. PADI training facility. Nicest boat in Keys. We beat any deal.	305/451-1151
PENNEKAMP STATE PARK CONCESSION Box 13M, MM 102.5, Key Largo, FL 33037 The only dive shop located directly in Pennekamp. Free brochure, send 50c for reef chart.	305/451-1621 800/432-2871
PLANTATION KEY LUXURY CONDO Plantation Villas, P.O. Box 17, Plantation Key, FL 33070 Beautiful 1 BR condo (sleeps 4) on bay. Has everything. Boat ramp & docks, pool. \$275/wk. or \$50/day, 5 day min.	305/852-5748
ROCK REEF RESORT P.O. Box 73, Key Largo, FL 33037 MM. 98 Divers Paradise, spacious grounds, beach, jacuzzi, comfortable accommodations and comfortable prices.	305/852-2401
SANDLEWOOD LODGE 12501 Overseas Hwy., Marathon, FL 33050 TV, air conditioned, refrigerator, budget rates, free ramp & dockage.	305/743-4922
SCUBA KEY WEST-CAPT BILLY c/o Reef Raiders Dive Shop, MM 4.5, US #1, Key West, FL 33040 Dive the Sambos, Ten Fathom Ledge, WW II wrecks, USS Wilkes Barre. Every dive an adventure.	305/294-0660
SEA DWELLERS SPORTS CENTER 99850 Overseas Hwy., Key Largo, FL 33037 Dive and snorkel Pennekamp Park. Special weekday rates.	305/451-3640
SEA TRAIL MOTEL Rt. 5, P.O. Box 91, Key Largo, FL 33037, MM 98.5 Cable TV, air conditioned, refrigerator, budget rates, 10% discount. Advanced reservations May through Nov.	305/852-8001
SEAFARER RESORT MOTEL P.O. Box 185, Key Largo, FL 33037 MM. 97.8 (Gulfside) 'Fantasy Island' setting, real sandy beach & free boats. Clean rooms & efficiencies, 10% discount & group rates.	305/852-5349
STEVE KLEM U/W GUIDE SERVICE P.O. Box 1803, Key Largo, FL 33037 MM. 104 Dive with the legendary 'Pied Piper of Pennekamp Park'. Let Steve introduce you to his U/W pets. 6 divers only.	305/451-1831

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THE DIVE SHOP U/W EDUCATORS 2175 Old Concord Rd., Smyrna/Atlanta, GA 30080 PADI 5 Star complete diver educators. Scubapro, US Diver, sales, service, rental, air.	404/432-5574

HAWAII

ALOHA DIVE SHOP-KOKO MARINA Hawaii-Kai, Honolulu, HI 96825 "Gateway to Hanauma Bay" Scuba resort cert., tours, boat, sales, rental, NASDS, PADI.	808/395-8882 808/395-5922
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DAN'S DIVE SHOP, INC. 660 Ala Moana Bl., Honolulu, HI 96813 Daily catamaran scuba tours for novices, snorkelers. Since 1971, free info, jet ski, water ski, scuba repairs.	808/536-6181
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HAWAIIAN DIVERS 2344 Kamehameha Hwy., Honolulu, HI 96819 Hawaii's largest full-service sport diving center Come to the shop where the locals go!	808/845-6644
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MAUI DIVE SHOP P.O. Box 1018, Azeka Place, Kihei, HI 96753 Send for free Maui Diver's Guide, enclose \$1 postage. Dive charters to Molokini, rentals, 5 day scuba classes, windsurfing.	808/879-3388

OCEAN ACTIVITIES CENTER P.O. Box 1082, Kihei, HI 96753 2 dive boats, daily trips, small groups. Molokini, La Perouse, Kahoolawe, Lanai.	808/679-4485
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SHIP MATE DIVE SHOP & CHARTER SERVICE Sesuit Harbor, E. Dennis, MA Sales, rentals, repairs, charters, instruction, air. Wreck diving our specialty.	617/385-8782
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